# THE ROLE OF TEACHER EDUCATION IN THE DEVELOPMENT OF FIRST-YEAR TEACHERS' PEDAGOGY AND SELF-EFFICACY FOR INSTRUCTIONAL PRACTICES AND TECHNOLOGY INTEGRATION

A Dissertation

by

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# ABSTRACT

This multiple-article dissertation explores how teacher candidates enrolled in a post-baccalaureate teacher education and Master of Education program perform during their first year in the classroom in the areas of: (a) self-efficacy for general teaching practices; (b) teacher and student behaviors and interactions and characteristics of the overall classroom environment; and (c) self-efficacy and pedagogy for integrating technology into teaching and learning. The use of multiple classroom observation instruments made it possible to develop a multidimensional picture of the classroom environment, including teacher and student behaviors and interactions and technology availability and use, while the longitudinal surveys provided insight into the effects of time and experience on the teachers' beliefs in their own ability to be successful. Through the examination of this observation and survey data, patterns in participants' teaching practices as well as their levels of confidence emerged as their classroom teaching experience increased across the school year.

These studies have important implications for the field of teacher education. Not only should teacher preparation programs provide candidates with the knowledge and skills they need to be effective teachers, but also, they ought to foster high self-efficacy for being successful in the classroom, leading to greater resilience and dedication to the teaching field. This research is an early step toward determining ways for teacher educators to more concretely examine the link between self-efficacy, instructional practice, and teacher effectiveness and career longevity. Perhaps by developing methods

for correlating findings from the observation and self-efficacy survey protocols with student achievement data, the connections between these important variables will become more concrete and readily able to be evaluated. The findings of these types of analyses can further inform teacher education programs as they make decisions regarding their structure and foci.

# DEDICATION

For my husband Matthew, my parents, my grandparents, and my sister.

Thank you for believing in me and in what I am capable of.

Your love, support, and encouragement have made this journey possible.

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# 1. INTRODUCTION

## Review of the Literature

It is important to address the challenges facing early-career teachers since their high attrition rates have substantial financial costs for schools and educational costs for students (Schwartz, Hernandez, & Ngo, 2010). On average, 30% of early-career teachers leave the classroom within their first three years in the profession (Darling-Hammond, 2003; Hargreaves & Fullan, 2012). Though the number of teachers prepared exceeds the number hired, there are far fewer teachers actually entering the profession than exiting – and the gap continues to grow by the year (Darling Hammond, 2003). This problem is especially an issue for schools and districts populated by poor and minority students as turnover is 50% higher for high-poverty schools (Darling-Hammond, 2003). Immense amounts of time, money, and other resources are spent hiring and training teachers for a few years of service, only to have to be replaced before they master the teaching skills needed to create a successful learning culture (NCTAF, 2007). In a 2014 press release, the Alliance for Excellent Education reported that due to the annual attrition of approximately half a million teachers, the United States spends up to $2.2 billion to recruit, hire, and train replacements (Teacher Attrition Costs, 2014). In addition, the National Commission on Teaching and America's Future (2007) published the following key findings from their study examining teacher turnover in five school districts across the U.S.:

- Between $4,000 and $18,000 are lost by school districts for each teacher that leaves;
- There is a correlation between low school performance, high poverty, and teacher turnover; and
- Teacher turnover in at-risk schools drains important resources that might otherwise be directed toward improving teacher effectiveness and student academic growth.

In light of the substantial impact that teacher attrition has on students, schools, and districts, it is important to take note of the reasons early-career educators decide to leave. On average, teacher salaries are 20% lower than those of other professions requiring a comparable amount of education, making new teachers more likely to leave, especially from higher-poverty districts that offer lower wages, for jobs with more competitive salaries (Darling-Hammond, 2003). In addition, teachers who are dissatisfied with elements of their working conditions (e.g., lack of administrative support, low student motivation and discipline, and scarcity of necessary materials), which tend to be especially prevalent in at-risk schools, have an increased likelihood of leaving the classroom (Loeb, Darling-Hammond, & Luczac, 2005).

In addition to issues regarding salary and working conditions, teacher preparation and the resulting confidence levels for being successful in the field have a measurable impact on teacher quality and retention. Teachers who do not feel adequately prepared are more likely to leave the teaching field sooner than those who feel better equipped for the challenges that accompany a career in education (Darling-Hammond, Chung, &

Frelow, 2002; Hoigaard, Giske, & Sundsli, 2012). Self-efficacy beliefs are strongly impacted by teachers' experiences in their own classrooms (Tschannen-Moran & Hoy, 2007), which are heavily influenced by preparation experiences. This connection suggests the importance of teacher education programs developing preservice candidates' self-efficacy, leading to greater retention rates.

To help bolster novice teachers' self-efficacy and ultimately career-longevity, teacher educators need to be aware of the challenges that new teachers face when they enter the field for the first time. New teachers especially need support in managing the unpredictability of classroom teaching and learning (Day & Guo, 2010). The transition from student to teacher can be sudden, dramatic, and jarring (Flores & Day, 2006). The first year of teaching involves a steep learning curve accompanied by high emotions. Novices spend that year focused on survival and discovery as they encounter reality shock, a struggle to endure, and loss of idealism (Feiman-Nemser, 2003). Teachers have the most difficulty in their first year in the field and they leave their preparation programs with high levels of concern regarding their abilities to teach (Adam, 1982; Day & Guo, 2010). At the culmination of the first year in the field, they realize that they did not feel fully prepared for the tasks and duties required of them (Flores & Day, 2006). However, despite how difficult they tend to feel the job is, their self-efficacy for negotiating the challenges that it presents generally increase by the end of the first year (Smeaton & Walters, 2013). They realize that teaching is more demanding than they originally thought it would be but feel that learning-by-doing was very helpful (Flores & Day, 2006).

New teachers have the same responsibilities as their more experienced counterparts, but everything is new to a first-year teacher and they have questions about every aspect of the job (Feiman-Namser, 2003; Fox & Peters, 2013). They are challenged by reconciling the demands and reality of teaching with their own ideals, beliefs, and practices (Flores & Day, 2006). Individual teachers have personal learning agendas that are relevant to their own context and therefore they tend to focus on and learn what is situationally relevant as they go (Feiman-Nemser, 2003).

Teacher education programs need to provide candidates with the content knowledge and teaching skills necessary to succeed in the profession, and aid in the development of those candidates' confidence in their own teaching abilities. Teachers' feelings of self-efficacy with regard to their practice affect their own classroom behaviors, which are linked to student outcomes (Tschannen-Moran & Johnson, 2011; Darling-Hammond, Chung, & Frelow, 2002).

In light of the many challenges facing new teachers, it is vital for teacher education programs to focus on the development of high self-efficacy and sound pedagogy for each candidate. With increased understanding of the emotional and practical transition from student to teacher, programs can better tailor their coursework and field requirements to the needs of novices as they prepare to enter the profession. This multiple-article dissertation focuses on three important issues related to first-year teachers and specifically examines three aspects of first-year teachers' experiences: (a) self-efficacy for general teaching practices, (b) classroom instruction and behaviors, and

(c) technology integration. The following sections describe these three challenging facets and briefly summarize some of the relevant research in each area.

**Self-Efficacy and Novice Teachers**

The teacher's professional identity plays a role in self-efficacy, motivation, commitment, and job satisfaction (Day, Kington, Stobart, & Sammons, 2006). Three of the main influences on teachers' professional identities include: prior influences (past experiences as students), initial teacher training and practice (motivations for becoming a teacher and related learning experiences), and contexts of teaching (classroom practices, school culture, and campus leadership) (Flores & Day, 2006). Feelings of self-efficacy are based on past performance in relevant settings, motivation to succeed, and context (Lent & Brown, 2006). They are most malleable during teacher preparation and the early stages of the career, but they solidify as experience accumulates (Klassen & Chiu, 2010). Successful experiences foster high self-efficacy (Fox & Peters, 2013), but self-efficacy is future-oriented (Tschannen-Moran & Hoy, 2001).

Though teachers' beliefs regarding their abilities are based on their *previous* experiences, successes, and challenges, their feelings of self-efficacy affect their *future* classroom behaviors, which are linked to student outcomes (Tschannen-Moran & Johnson, 2011; Darling-Hammond, Chung, & Frelow, 2002). More specifically, teachers' self-efficacy refers to their belief that they have the knowledge and skills necessary to have a positive effect on student outcomes (Daniels, Mandzuk, Perry, & Moore, 2011; Klassen & Chiu, 2010; Tschannen-Moran & Hoy, 2001). In the case of

preservice teachers, the way they perceive their teaching skills transforms how they self-actualize as inservice teachers (Tschannen-Moran & Johnson, 2011). Their fit perceptions, or the extent to which they perceive that their abilities meet the demands of the profession (Conklin, Dahling, & Garcia, 2012; Wessel, Ryan, & Oswald, 2008), foster confidence and influence their anticipated performance (Conklin, Dahling, & Garcia).

It takes new teachers three to four years to achieve teaching competency and several more to reach proficiency (Feiman-Nemser, 2003). Years of experience, among other factors, is connected with self-efficacy for classroom management, instructional strategies, and student engagement (Klassen & Chiu, 2010), so it makes sense that preservice teachers feel less confident than their inservice counterparts. In fact, self-efficacy in the areas of teaching strategies, classroom management, and student engagement generally peaks in the range of 20 to 25 years of experience (Klassen & Chiu, 2010).

Fuller (1969) posited that teacher concerns can be classified into two categories: concerns about self and concerns about pupils. Preservice and beginning teachers were found to be more concerned with their own success and comfort than with the success and comfort of their students, resulting in a strong focus on classroom management and approval from evaluators and students (Fuller, 1969). On the other hand, Fuller found that more experienced teachers were more likely to focus on the benefits of their instruction for their students (Fuller, 1969).

The disparity between new teachers' levels of confidence and those of more experienced teachers highlights a major responsibility of teacher education programs. According to Social Cognitive Theory, self-efficacy beliefs are key determinants of thought and action (Lent & Brown, 2006), and they influence teacher effectiveness, especially for first-year teachers (Fox & Peters, 2013). Effective teacher education programs increase self-efficacy, job satisfaction, and retention of new teachers (Ingersoll & Smith, 2004; Mueller, 2012), further supporting the need for teacher educators who can not only supply candidates with the knowledge and skills associated with effective teaching, but also with experiences and support that nurture confidence and self-efficacy for teaching.

**Classroom Observations and Teacher Education**

Though it has been used for a myriad of educational research purposes, one area where classroom observation has been underutilized is teacher education. Within the context of teacher education and preparation, observation practices are often implemented as a program requirement where candidates are the ones required to conduct observations of experienced educators, who serve as models of effective teaching practice. Previous studies have examined how these observational experiences develop an understanding of teaching and learning processes (Starks, Nicholas, & Macdonald, 2012) and of pedagogical content knowledge (Xiong, 2013) in addition to how their benefits are impacted by method and medium of observation (i.e. onsite vs. videoconference observations) (Pickering & Walsh, 2011). However, classroom

observation methods have not commonly been used to focus on the behaviors of novice teachers participating in teacher education programs.

Clinical field-based experiences, content knowledge, and candidate quality are the three most important components for preparing future teachers to positively affect student achievement (Learning, 2010). While the ideas addressed in traditional preparatory courses are essential, it is important that candidates are provided opportunities to try them in authentic settings as they bridge the gap between theory and practice and develop a deeper understanding of the classroom environment (Darling-Hammond, 2006). There are a variety of clinical practice models facilitated by teacher education programs, some of which include student teaching (Boyd, Grossman, Lankford, & Loeb, 2009; Greenberg, Pomerance, & Walsh, 2011), co-teaching (Van Zastrow, 2009), urban teacher residencies (Berry, Montgomery, & Snyder, 2008; Newman, 2009; Papay, West, Fullerton, & Kane 2012), and internships (O'Brien, 2010).

Observation research is a valuable method for studying classroom contexts because it allows researchers to study and collect detailed information about environmental characteristics and student and teacher behaviors within naturalistic settings. It has been widely used to collect data with respect to student-teacher interactions (Pianta, la Paro, Payne, Cox & Bradley, 2002), technology integration (Inan, Lowther, Ross & Strahl, 2010), instructional quality (Stuhlman & Pianta, 2009), and specific teaching and learning behaviors (Waxman, Padrón, Franco-Fuenmayor & Huang, 2009). Going beyond simple value-added protocols commonly used to measure teacher effectiveness, this method increases the overall understanding of effective

teaching (Waxman et al., 2009). As an indicator of teacher quality, classroom observations measure teaching practices and enable the researcher to establish relationships between ratings and student learning (Sartain et al., 2011; Stuhlman & Pianta, 2009).

**Preservice Teacher Preparation for Technology Integration**

Teachers' perception of technology's usefulness and ease of use are key determinants of their intention to integrate technology into their instruction and its use in the classroom (Ma, Andersson, & Streith, 2005). As such, preservice teachers may perhaps receive training on how to effectively use technology and integrate it into their teaching. Since the quality of technology use is more critical to student learning than quantity is (Lei & Zhao, 2007), there has been an ongoing effort to improve teachers' use of technology in the classroom (Campbell & Martin, 2010; Clausen, 2007). This emphasis has generated numerous studies and recommendations regarding the importance of teacher preparedness and belief in technology incorporation as well as best practices for preparing new teachers to meaningfully integrate technology into their teaching.

Preservice teacher education should focus on teachers' pedagogical readiness and beliefs regarding technology integration as well as basic technology competencies and skills (Inan, Lowther, Ross, & Strahl, 2010). The teachers' overall developmental process includes their own K-12 experiences as students, their teacher education coursework, their preparatory field experiences, and their induction and early career

teaching experiences (Feiman-Nemser, 2003). Although new teachers often have excellent technology for their own personal or professional practice, they typically struggle with how to integrate technology into their instruction. Early career teachers tend to question the effectiveness of using technology for instructional purposes because they believe that use of technology in the classroom increases classroom management issues (Russell et al., 2003). To combat this resistance, they could acquire the knowledge and skills that will help them figure out how technology can function within their own pedagogy and in what capacity to most effectively influence positive student learning outcomes (Inan et al., 2010). Their attitudes and beliefs toward technology greatly influence how they adopt and use it in their classrooms (Russell et al., 2003).

The potential of technology integration into classroom teaching and learning cannot be fully realized unless teachers are adequately trained and prepared to effectively use it for instructional purposes (Russell et al., 2003). Teacher preparation programs should allow preservice teachers to experience how technology can enhance teaching and learning through examples and models (Russell et al., 2003). This can be accomplished by including training for integrating technology into pedagogy (Lee, Waxman, Wu, Michko, & Lin, 2013) by introducing teachers to technology devices and applications that are available for classroom use so that they can become conversant and aware of how it can affect their professional practice (Campbell & Martin, 2010; Russell et al., 2003).

## Purpose of the Dissertation

The purpose of this multiple-article dissertation is to explore how teacher candidates enrolled in a post-baccalaureate teacher education and Master of Education program perform in their first year in the classroom. Secondary data analysis will be used to examine:

(1) how preservice teachers' self-efficacy and confidence for general teaching practices varies at four points across their education and induction year: (a) the first day of their summer methods courses, (b) the last day of their summer methods courses, (c) November of their first year of teaching, and (d) April of their first year of teaching;

(2) how first-year intern secondary teachers' classrooms compare to those of more experienced teachers with respect to teacher and student behaviors, and overall classroom environment characteristics; and

(3) first-year teachers' self-efficacy for integrating technology into teaching and learning as well as how they actually use technology to support teaching and learning.

The results of this dissertation may provide insight for teacher education programs as they evaluate their objectives and curricula. It might inform them of the importance of not only focusing on providing aspiring teachers with the knowledge and skills needed for effective teaching, but also on building those candidates' confidence in their own ability to be successful teachers. In addition, it will expand the existing

research base for evaluating novice teachers and the effectiveness of their teacher education programs using a classroom observation methodology.

# 2. CHANGES IN FIRST-YEAR TEACHERS' SELF-EFFICACY AND CONFIDENCE IN TEACHING

## Introduction

It is important to address the challenges first-year teachers face in the school environments to combat the high attrition rate within the profession, which averages from 30% to nearly 50% in high-poverty areas across the first three years in the field (Darling-Hammond, 2003; Hargreaves & Fullan, 2012). These high attrition rates and the resulting vacancies and turnover have substantial financial costs for schools and educational costs for students (Schwartz, Hernandez, & Ngo, 2010). According to NCTAF (2007), between $4,000 and $18,000 are lost by school districts for each teacher that leaves; there is a correlation between low performance, high-poverty, and teacher turnover; and teacher turnover in at-risk schools drains important resources that might otherwise be directed toward improving teacher effectiveness and student academic growth. The Alliance for Excellent Education (2014) reported that due to the annual attrition of approximately half a million teachers, the United States spends up to $2.2 billion to recruit, hire, and train replacements (Teacher Attrition Costs, 2014). The detriments to schools and students that result from teacher attrition are cause enough to examine the challenges and concerns of novice teachers.

New teachers especially need support in managing the unpredictability of classroom teaching and learning (Day & Guo, 2010). The transition from student to teacher can be sudden, dramatic, and jarring (Flores & Day, 2006) as the first year of

teaching involves a steep learning curve accompanied by high emotions. Novices spend that year focused on survival and discovery as they encounter reality shock, a struggle to endure, and loss of idealism (Feiman-Nemser, 2003). Teachers have the most difficulty in their first year in the field and they leave their preparation programs with high levels of concern regarding their abilities to teach (Adam, 1982; Day & Guo, 2010). At the culmination of the first year in the field, they often realize that they did not begin their career feeling fully prepared for the tasks and duties required of them (Flores & Day, 2006). However, despite how difficult they tend to feel the job is, their self-efficacy for negotiating the challenges that it presents generally increases by the end of the first year (Smeaton & Walters, 2013). First-year teachers realize that teaching is more demanding than they originally thought it would be but feel that learning-by-doing is very helpful (Flores & Day, 2006).

New teachers have the same responsibilities as their more experienced counterparts, but everything is new to a first-year teacher and they have questions about every aspect of the job (Feiman-Namser, 2003; Fox & Peters, 2013). They are challenged by reconciling the demands and reality of teaching with the ideals, beliefs, and practices that they bring with them from previous experiences (Flores & Day, 2006). Based on these previous experiences, individual teachers have personal learning agendas and therefore should focus on and learn what is situationally pertinent their own teaching context as they go (Feiman-Nemser, 2003).

Vonk, (1989) asserts that there are two phases of new teacher development. "Threshold" encompasses the first year of teaching as novices begin to experience and

embrace the challenges of full teaching responsibilities (Veenman, 1984). Teachers "grow into the profession" as their pupils and colleagues begin to accept them in their role and their own attention becomes focused on teaching skill development and improvement rather than simply surviving (Vonk, 1989). Through the challenges of their first-year teaching experiences, early-career novices should strive to find their own identity as educators (Flores & Day, 2006).

**Self-Efficacy and Novice Teachers**

The teacher's professional identity plays a role in self-efficacy, motivation, commitment, and job satisfaction (Day, Kington, Stobart, & Sammons, 2006). Three of the main influences on teachers' professional identities include: (a) prior influences (past experiences as students), (b) initial teacher training and practice (motivations for becoming a teacher and related learning experiences), and (c) contexts of teaching (classroom practices, school culture, and campus leadership) (Flores & Day, 2006). Feelings of self-efficacy are based on past performance in relevant settings, motivation to succeed, and context (Lent & Brown, 2006) and can change with experiences of perceived success or failure (Bandura, 1977). They are most malleable during teacher preparation and the early stages of the career, but they solidify as experience accumulates (Klassen & Chiu, 2010). Successful experiences foster high self-efficacy (Fox & Peters, 2013), but self-efficacy is future-oriented (Tschannen-Moran & Woolfolk Hoy, 2001).

Though teachers' beliefs regarding their abilities are based on their *previous* experiences, successes, and challenges, their feelings of self-efficacy affect their *future*

classroom behaviors, which are linked to student outcomes (Tschannen-Moran & Johnson, 2011; Darling-Hammond, Chung, & Frelow, 2002). More specifically, teachers' self-efficacy refers to their belief that they have the knowledge and skills necessary to have a positive effect on student outcomes (Daniels, Mandzuk, Perry, & Moore, 2011; Klassen, et al., 2009; Tschannen-Moran & Woolfolk Hoy, 2001). In the case of preservice teachers, the way they perceive their teaching skills transforms how they self-actualize as inservice teachers (Tschannen-Moran & Johnson, 2011). Their fit perceptions, or the extent to which they perceive that their abilities meet the demands of the profession (Conklin, Dahling, & Garcia, 2012; Wessel, Ryan, & Oswald, 2008), foster confidence and influence their anticipated performance (Conklin, Dahling, & Garcia).

Years of experience, among other factors, is connected with self-efficacy for classroom management, instructional strategies, and student engagement (Klassen & Chiu, 2010), so it follows that preservice teachers feel less confident than their inservice counterparts for classroom management (Klassen & Chiu, 2011). In fact, self-efficacy in the areas of teaching strategies, classroom management, and student engagement generally peaks in the range of 20 to 25 years of experience (Klassen & Chiu, 2010). At the same time, it takes new teachers three to four years to achieve teaching competency and several more to reach proficiency (Feiman-Nemser, 2003), highlighting the role that teacher education plays in sustaining the teaching field.

According to Social Cognitive Theory, self-efficacy beliefs are key determinants of thought and action (Lent & Brown, 2006). Self-efficacy influences teacher

effectiveness, especially for first-year teachers (Fox & Peters, 2013). Effective preparation programs increase self-efficacy, therefore supporting the job satisfaction and retention of new teachers (Ingersoll & Smith, 2004). The implication that confidence and career longevity are related insinuates that for teachers to remain in the field long enough to maximize their effectiveness, they must start out with strong and sustainable confidence levels that can fuel persistence and resilience. By promoting preservice and novice teachers' self-efficacy, teacher education programs contribute to the necessary confident attitudes, and the resulting commitment to the teaching field (Weber, Hodges, & Waxman, 2013).

**Purpose of the Study**

The purpose of this study is to examine how preservice teachers' self-efficacy for general teaching practices varies at four points across their education and induction year: (a) the first day of their summer methods courses, (b) the last day of their summer methods courses, (c) November of their first year of teaching, and (d) April of their first year of teaching. Through analysis of the survey responses from four cohorts of teachers, collected at the four specified points in time, we attempt to determine how educational and field experiences impact confidence levels for teaching tasks like managing the classroom, integrating technology and real life objects into teaching and learning, and differentiating instruction for all students.

## Methods

### Participants

The sample of participants consisted of four cohorts (with 56, 55, 43, and 38 participants respectively) of first-year secondary teachers in a field-based internship program, which is part of their M.Ed. coursework at a large, research-based university in Texas. The certification portion of the program includes three teaching methods-based graduate courses that are taken during a single summer, followed by a year-long paid internship at a state-accredited and -subsidized secondary school of the teacher's choice. The teachers are responsible for finding and procuring their own internship positions with support and guidance from the program faculty and staff. The internship positions were located at a variety of middle and high school campuses in rural, suburban, and urban areas across Texas.

### Instrument

**TAMU Collaborative Cohort Survey.** The *TAMU Collaborative Cohort Survey* includes two sections of Likert-type items addressing the respondents' confidence in their ability to successfully fulfill an array of teaching-related responsibilities and integrate the cross-disciplinary College and Career Readiness Standards in their instruction (Brown, Rollins, Alford, Waxman, & Stillisano, 2012). The participants were asked to rate their confidence for each item on a four-point scale (1 = "not at all confident," 2 = "somewhat confident," 3 = "confident", and 4 = "extremely confident"). This study focuses on Part II of the survey, which includes 15 items related to general teaching skills and tasks, like: "maintain effective classroom

management," "develop strategies for working with parents and families," and "integrate technology in the delivery of instructional content."

**Data Collection**

Data was collected from the summer of 2010 to the spring of 2014, each cohort spanning a year. Researchers surveyed all four cohorts of students over the course of the certification program to examine their level of confidence in establishing an effective learning environment. Surveys were administered to each cohort at four different critical points: (a) on the first day of the summer methods courses; (b) on the last day of the summer methods courses; (c) in November of the internship teaching year; and (d) in April of the internship teaching year. Since all four cohorts were from the same teacher education program, they were examined simultaneously as a single group.

## Results

The 15 survey items of interest were isolated and reduced to four latent variables through exploratory Principal Components Analysis with a Varimax rotation. Small coefficients below .40 were suppressed to minimize the number of variables that loaded on multiple components. The four components are: (a) creating an effective and inclusive learning environment, (b) differentiating instruction for all students, (c) respecting cultural and familial differences, and (d) integrating strategies and tools for teaching and learning (see Table 2.1). Collectively, the four factors explain 56.656% of the total variance in survey responses. The reliabilities of the four factors or scales are also good, ranging from 0.738 to 0.808.

*Table 2.1: Factor Loadings of General Teaching Skills and Tasks Survey Items*

| Survey Item | Creating an effective and inclusive learning environment | Differentiating instruction for all students | Respecting cultural and familial differences | Integrating strategies and tools for teaching and learning |
|---|---|---|---|---|
| Maintain effective classroom management | 0.613 | | | |
| Create a lesson plan | 0.589 | | | |
| Employ effective instructional strategies for students from a variety of cultural backgrounds | 0.673 | | | |
| Employ effective instructional strategies for students from varying socioeconomic backgrounds | 0.779 | | | |
| Employ effective instructional strategies for students with special needs | | 0.832 | | |
| Employ effective instructional strategies for students who speak English as a second language | | 0.645 | | |
| Differentiate instruction for all students | | 0.444 | | |
| Develop strategies for working with parents and families | | | 0.699 | |
| Recognize and respect individual family differences | | | 0.712 | |
| Maintain ongoing parent communication | | | 0.748 | |
| Create a learning environment that encourages students to appreciate cultural diversity | | | 0.59 | |
| Integrate multiple subject areas | | | | 0.506 |
| Integrate technology in the delivery of instructional content | | | | 0.825 |
| Create an authentic learning environment via the use of real-life tools/experiences | | | | 0.651 |
| Prepare high school students to be academically successful in college courses | | | | 0.714 |
| **Cronbach's alpha** | 0.738 | 0.808 | 0.745 | 0.804 |
| **Total Variance Explained (%)** | 17.355 | 16.809 | 16.464 | 15.097 |

Based on the PCA outcome, four composite variables were created by averaging the items from each component. We used multivariate analyses of variance (MANOVA) to determine if there were any differences across the four cohorts. The results, however, revealed very few meaningful differences between the groups so we aggregated the data for all subsequent analyses. We then used MANOVA to explore any changes across the school year in the teachers' self-efficacy for the four components (see Table 2.2).

*Table 2.2: MANOVA Results for Self-Efficacy Changes Across Survey Administrations*

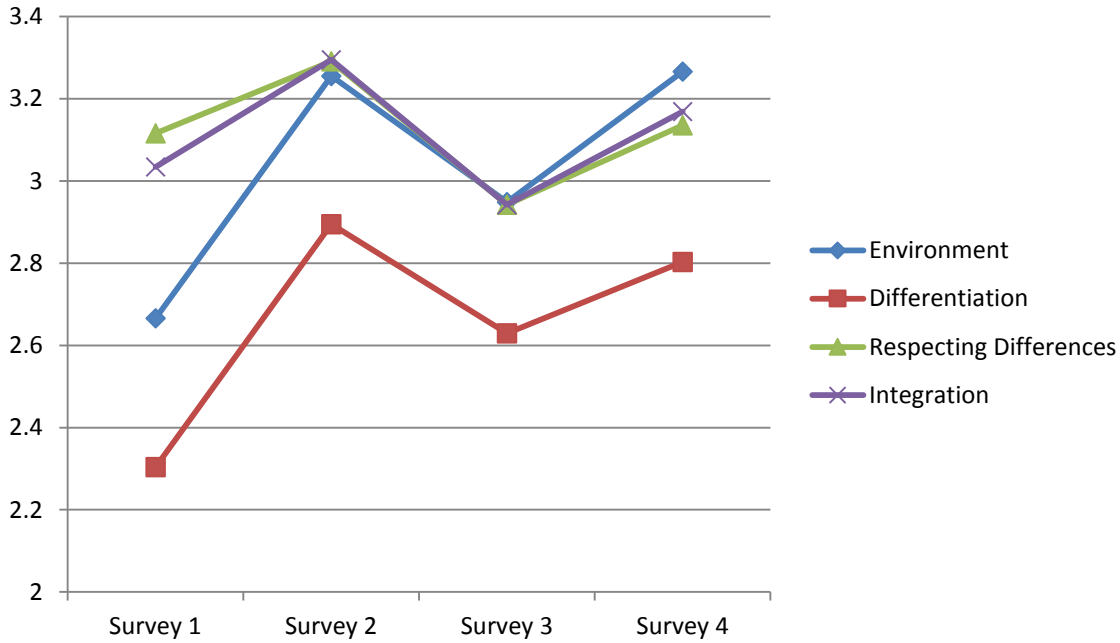
| | | | **Beginning of Summer Methods Courses** | | **End of Summer Methods Courses** | | **Fall Semester of internship year** | | **Spring Semester of internship year** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *F* |
| **Component** | 12 | 22.970*** | | | | | | | | | |
| Creating an effective and inclusive learning environment | | | 2.666[c] | 0.530 | 3.255[a] | 0.458 | 2.948[b] | 0.521 | 3.266[a] | 0.478 | 57.533*** |
| Differentiating instruction for all students | | | 2.304[c] | 0.561 | 2.895[a] | 0.610 | 2.629[b] | 0.662 | 2.803[a] | 0.602 | 32.481*** |
| Respecting cultural and familial differences | | | 3.116[b] | 0.500 | 3.291[a] | 0.435 | 2.942[c] | 0.523 | 3.135[b] | 0.493 | 15.013*** |
| Integrating strategies and tools for teaching and learning | | | 3.034[bc] | 0.492 | 3.295[a] | 0.466 | 2.942[c] | 0.594 | 3.169[ab] | 0.571 | 14.928*** |

*1 = Not at all confident; 2 = Somewhat confident; 3 = Confident; 4 = Extremely Confident*
*** $p < 0.001$; ** $p < .01$; * $p < .05$*

The Multivariate Analysis of Variance (MANOVA) results revealed a significant multivariate effect over time (i.e., beginning of summer methods courses, end of summer methods courses, fall of internship year, and spring of internship year), and follow-up

univariate *F*-tests indicated that there were significant differences between administrations for each of the four components (Environment, Differentiation, Respecting Differences, and Integration). Tukey post hoc tests showed a similar pattern across time for each component in which the teachers mean self-efficacy in all four areas increased from the beginning to the end of the summer methods courses; then it decreased in the fall semester and finally increased again in the spring for the final survey (see Figure 2.1).

*Figure 2.1: Self-Efficacy for General Teaching Skills and Tasks Changes Across Survey Administrations*




The teachers started the summer methods courses feeling between somewhat confident and confident ($M$ = 2.666) about their ability to create an effective and

inclusive learning environment. At the culmination of the summer methods courses, their self-efficacy increased to between confident and extremely confident ($M$ = 3.255), indicating that the courses increased their knowledge of teaching strategies and tools while also making them feel comfortable implementing them. After the first several months in the classroom, their confidence in this area decreased to slightly less than confident ($M$ = 2.948), but five months later it increased again and peaked ($M$ = 3.266). All changes in self-efficacy for creating an effective and inclusive learning environment were significant at the $p < 0.001$ level.

At the beginning of the summer methods courses, the teachers reported feeling between somewhat confident and confident ($M$ = 2.304) about their ability to differentiate instruction for all students. At the culmination of the summer methods courses, their self-efficacy increased, moving closer to confident ($M$ = 2.895), implying that the courses increased their knowledge of teaching strategies and tools for differentiation while also making them feel comfortable implementing them. By the end of the fall semester, their confidence in this area decreased ($M$ = 2.629), but by the end of the spring semester, it increased again ($M$ = 2.803). All changes in self-efficacy for differentiating instruction for all students were significant at the $p < 0.001$ level.

The teachers began the summer methods courses feeling between confident and extremely confident ($M$ = 3.116) about their ability to respect cultural and familial differences. At the culmination of the summer methods courses, their self-efficacy moved closer to extremely confident ($M$ = 3.291), suggesting that the summer courses increased their knowledge and appreciation for cultural and familial differences. After

the first several months in the classroom, their confidence in this area decreased to slightly less than confident ($M$ = 2.942), but five months later it increased again to confident ($M$ = 3.135). All changes in self-efficacy for respecting cultural and familial differences were significant at the $p < 0.001$ level.

As the summer methods courses began, the teachers reported feeling slightly more than confident ($M$ = 3.034) about their ability to integrate strategies and tools for teaching and learning. As the summer methods courses ended, their self-efficacy increased to between confident and extremely confident ($M$ = 3.295), signifying that the courses increased their knowledge of teaching strategies and tools while also making them feel comfortable implementing them to support teaching and learning. After the first several months in the classroom, their confidence in this area decreased to slightly less than confident ($M$ = 2.942), but by the end of the school year, it increased again ($M$ = 3.169). All changes in self-efficacy for integrating strategies and tools for teaching and learning were significant at the $p < 0.001$ level.

## Discussion

Self-efficacy is not fixed and can change with experiences of perceived success or failure and mastery experiences, among other factors (Bandura, 1977). The first year of teaching can be an emotional roller-coaster as novice teachers are confronted with reconciling their own ideals, and values based on past experiences as students and in their teacher education programs with the reality of the responsibilities and expectations associated with teaching. Teachers' emotional commitment impacts how they feel about their careers as well as their ability to be successful in the field (Day & Guo, 2010).

Successful teacher preparation encourages high self-efficacy, and those who do not feel confident in their preparation leave the field sooner than those who feel well-equipped (Darling-Hammond, Chung, & Freelow, 2002; Klassen & Chiu, 2011), further highlighting the important role of teacher preparation for developing self-efficacy.

The results of this study show how volatile new teachers' self-efficacy is as they navigate their induction into the teaching field. We found that self-efficacy improves with increased education and preparation for entering the field, which was observed from the first to the last day of their summer methods courses. However, once they are in the classroom and faced with applying what they learned, their confidence lapses as the fall semester progresses. The abrupt clash between what they believed they knew and were capable of and the reality of learning-through-doing proved challenging and, to a certain degree, demoralizing. As was demonstrated by the rise in self-efficacy scores in the spring semester, confidence does appear to increase with experience.

Limitations for this study primarily center around the sample. All four cohorts of participants were from the same teacher education programs. In the future, researchers should collect longitudinal self-efficacy data for preservice and first-year teachers from a variety of preparation programs to determine if similar patterns exist. Furthermore, researchers should pursue ways to further reinforce the links between new-teacher self-efficacy, teaching effectiveness, and career longevity.

The present findings have important implications for the field of teacher preparation because they highlight the need for building preservice teachers' self-efficacy for teaching and for raising their awareness of the challenges that come with

entering the teaching profession. Many programs involve classroom observations, student teaching, and other field experiences in their requirements. However, it is difficult for these types of activities, which rely on limited involvement of the teacher-in-training within the classroom environment, to truly prepare the hopefuls for what lies ahead.

Teachers in their first three years leave the profession at an alarming average of 30% (Hargreaves & Fullan, 2012). By maximizing their readiness, in both skill and emotional preparedness, teacher education programs can help increase the chances of early-career teachers remaining in the field. An understanding of the relationship that exists between teacher education and self-efficacy may assist in the identification of programmatic aspects that most effectively prepare preservice teachers for the field (Daniels, et al., 2011). High self-efficacy contributes to teachers' retention and perseverance, which in turn facilitates improvements in teaching skills and impacts self-actualization (Tshannen-Moran & Johnson, 2011). Together, these factors affect student learning and academic success. Guo, et al. (2012) observed that teachers with higher self-efficacy tended to provide a more positive classroom environment with a greater degree of student support than those with lower self-efficacy, which led to stronger student literacy skills. With this in mind, teacher educators should seek ways of not only nurturing high and prolonged self-efficacy, but also for teaching candidates how to cope with the confidence-rattling challenges that they may encounter upon entering the classroom.

# 3. CLASSROOM INSTRUCTION DIFFERENCES BETWEEN FIRST-YEAR TEACHING INTERNS AND EXPEREINCED CLASSROOM TEACHERS

## Introduction

One of the major tenets of the No Child Left Behind Act of 2001 (NCLB) is the emphasis on increasing student achievement by holding schools, districts, and states more accountable for academic growth. Under threat of governmental intervention, schools are required to reach adequate yearly progress (AYP), which dictates how the overall student population as well as key demographic student groups must perform in meeting state academic content standards (i.e., annual standardized tests and graduation rates). In 2009, the announcement of Race to the Top further emphasized the pressure on educators to perform as it reiterated NCLB's call for the use of data-driven instructional practices and mandated the development of statewide longitudinal datasets to assess teacher efficacy. Recognizing that simply looking at standardized test scores does not provide a complete picture of a specific school's or teacher's effect on student learning, methods like value-added modeling have emerged in an effort to estimate teacher quality based on student improvement (Doran & Fleishman, 2005). This focus on individual teachers combats the "Widget Effect," referring to the common assumption that teacher effectiveness is consistent across classrooms within a particular school while neglecting to appreciate the impact of each individual educator (Weisberg, Sexton, Mulhern, & Keeling, 2009). The national drive to link what teachers actually do in their classrooms to how their students perform academically has created a need for

classroom observation research to examine the nuances and intricacies of the diverse and dynamic teaching field.

Observation research is a valuable method for studying classroom contexts because it allows researchers to study and collect detailed information about environmental characteristics and student and teacher behaviors within naturalistic settings. It has been widely used to collect data with respect to student-teacher interactions (Pianta, la Paro, Payne, Cox & Bradley, 2002), technology integration (Inan, Lowther, Ross & Strahl, 2010), instructional quality (Stuhlman & Pianta, 2009), and specific teaching and learning behaviors (Waxman, Padrón, Franco-Fuenmayor & Huang, 2009).

Classroom observation protocols are unique in that they focus on the aspects of teaching that can be reliably observed and assessed (Hamre et al., 2013) for the purpose of describing teachers' instructional practices (Hilberg, Waxman, & Tharp, 2004). The data collected from such measures directly inform the improvement of teaching practices (Hilberg et al., 2004; Hill & Grossman, 2013; TNTP, 2013) based on what is determined to be effective (O'Leary, 2012; Taylor & Tyler, 2012). Classroom observation research can go beyond simple value-added protocols to evaluate teacher effectiveness with valid and reliable measures of specific teacher behaviors and strategies (Kane, Taylor, Tyler, & Wooten, 2011). The observations can be triangulated with other data such as student achievement scores and survey responses to identify specific teaching practices that lead to positive student outcomes (Raphael, Pressley, & Mohan, 2008) like engagement (Raphael et al., 2008; Ross, Smith, Alberg, & Lowther, 2004) and academic

achievement (Kane et al., 2011). The incorporation of observation into the evaluation of teaching practices supports our overall understanding of effective teaching (Waxman et al., 2009) and directly responds to NCLB and Race to the Top's push for data-driven practice by allowing for the examination of how those teaching practices relate to student achievement.

**Teacher Assessment and Evaluation**

Stemming from the national emphasis on academic standards and quality teaching, classroom observations are commonly used as an evidentiary basis for assessing teachers in the field (Kane et al., 2011; O'Leary, 2012; TNTP, 2013) and as a method for holding them accountable for their students' learning (Hamre et al., 2013). Observations are conducted by school district and campus administrators as well as by teacher educators as they evaluate their students' progress in the field. The data collected goes beyond reflective self-report measures of self-efficacy to demonstrate novice teachers' actual classroom practices and behaviors during the transition from teacher education to the teaching profession (Malmberg, Hagger, Burn, Mutton, & Colls, 2010) as they consolidate theory and practice (Cockburn, 2005). This can result in meaningful feedback for new and experienced teachers to improve their practice (Kane & Staiger, 2012) as well as for administrators to guide their instructional and personnel-related decisions. Of particular interest is the potential for classroom observations to overcome the limitations of the value-added approach to teacher evaluation (e.g., some courses and grade-levels are not tested and some assessments are not designed to measure student growth). As an indicator of teacher quality, classroom observations

measure teaching practices and enable the researcher to establish relationships between ratings and student learning (Sartain et al., 2011; Stuhlman & Pianta, 2013).

**Systematic Classroom Observation**

Classroom observations allow researchers to collect evidence about what goes on in classrooms (O'Leary, 2012) in order to study teaching and learning in a naturalistic setting (Hilberg et al., 2004; Waxman et al., 2009). Not only do they allow for the description of the classroom and the organization of learning activities (Pianta et al., 2002), but also they can capture and illuminate details about the classroom environment, including the practices and interactions that take place (Hamre et al., 2013; Pianta et al., 2002; Roberson, 1998). By examining first-hand what is really going on in classrooms, researchers better understand the nature of those individual classrooms and the variations between them, allowing for identification of classrooms of quality and those in need of support (Stuhlman & Pianta, 2013). The classroom practices, like teacher/student and student/student interactions, behaviors, climate, and organization, can be correlated with other variables to determine what relationships exist (Pianta et al., 2002). Observed educational factors like student achievement (Kane & Staiger, 2012; Hill & Grossman, 2013; Kane et al., 2011) and instructional quality and inequities (Hilberg et al., 2004; Stuhlman & Pianta, 2013; Waxman et al., 2009) have been examined in response to mandates by NCLB and Race to the Top.

Whether the intent is to describe or to evaluate, to focus on a single aspect or on the learning environment as a whole, classroom observations provide the means for improving the quality of education for all students. It is conducive to implementation

across age groups and content areas (Hamre et al., 2013) and has the capacity to both assess the quality of the educational program and to facilitate its improvement (Guss, Norris, Horm, Monroe, & Wolfe, 2013). Furthermore, researchers can go beyond simply finding out what strategies teachers are using in the classroom to revealing *how* they facilitate learning through the environments they create and the interactions they have with students. When observations are conducted systematically and by well-trained observers, they provide reliable and comprehensive information (Hilberg et al., 2004) that sheds light on what teachers and schools do that affects positive student outcomes, enabling educational improvement and answering the national call for educator accountability and data-driven practice.

**Classroom Observations and Teacher Education**

Though it has been used for a myriad of educational research purposes, one area where classroom observation has been underutilized is teacher education. Within the context of teacher education and preparation, observation practices are often implemented as a program requirement. Candidates are required to conduct observations of experienced educators, who serve as models effective teaching practice. Previous studies have examined how these observational experiences develop an understanding of teaching and learning processes (Starks, Nicholas, & Macdonald, 2012) and of pedagogical content knowledge (Xiong, 2013) in addition to how their benefits are impacted by method and medium of observation (i.e. onsite vs. videoconference observations) (Pickering & Walsh, 2011). However, classroom observation methods

have not commonly been used to focus on the behaviors of novice teachers participating in teacher education programs.

Clinical, field-based experiences are one of the three most important components for preparing future teachers to positively affect student achievement alongside content knowledge and candidate quality (Learning, 2010). While the ideas addressed in traditional preparatory courses are essential, it is important that candidates are provided opportunities to try them in authentic settings as they bridge the gap between theory and practice and develop a deeper understanding of the classroom environment (Darling-Hammond, 2006; Snyder, 2012). There are a variety of clinical practice models facilitated by teacher education programs, some of which include student teaching (Boyd, Grossman, Lankford, & Loeb, 2009; Greenberg, Pomerance, & Walsh, 2011), co-teaching (Van Zastrow, 2009), urban teacher residencies (Berry, Montgomery, & Snyder, 2008; Newman, 2009; Papay, West, Fullerton, & Kane 2012), and internships (O'Brien, 2010). Regardless of the model, teacher education field experiences provide the unique opportunity to experience teaching and learning repeatedly and in tandem, which allows candidates to measure their own success and effectiveness based on their students' learning (Snyder, 2012).

The teacher education program of interest for the present study is a university-based post-baccalaureate internship program. Candidates are M.Ed. students working toward a state secondary certification in mathematics, science, social studies, reading and language arts, or a foreign language. The program requires extensive prerequisite course work in the chosen content area as well as two field-based teacher education

classes and a course in special populations prior to enrollment. It begins in a cohort format during the summer with two methods classes and a content area literacy class. The candidates are responsible for procuring a probationary teaching position, or internship, for the following Fall and Spring semesters in a state accredited secondary school of their choice. As interns, the candidates are accountable for all responsibilities of a fully certified teacher as well as completing a seminar course each semester, designed to support them through their first year in the classroom. They are observed and provided feedback at least once per semester by their program director, who is also their methods and seminar professor.

The purpose of the present study is to examine how first-year intern secondary teachers' classrooms compare to those of more experienced teachers with respect to teacher and student behaviors and overall classroom environment characteristics. Each of these four facets was measured simultaneously with a unique classroom observation tool. Each of the instruments reveals a different perspective of the classroom procedures, combining to provide a comprehensive picture not otherwise possible through any one of the instruments alone.

## Methods

### Participants

The internship program group consisted of 18 first-year secondary teachers in a field-based internship program, which is part of their M.Ed. coursework at a large, research-based university in Texas. The internship positions were located at a variety of middle and high school campuses in both rural and urban areas across Texas. The

observations took place during the Spring semester and participants were notified within a week prior to the observations.

The comparison group consisted of teachers with approximately eight years of successful classroom experience, involved in traditional teacher education programs from similar schools. All participants in this group volunteered to participate in the study. To ensure the validity of the comparison between the internship group and the comparison group, campus make-up information was obtained from the Texas Education Agency's Academic Excellence Indicator System (AEIS) campus reports. Based on the most recent available data, the 2011-2012 reports, an analysis of variance showed that there were no statistically significant differences between the two groups in terms of percentages of economically disadvantaged (ECOD), limited English proficiency (LEP), at-risk, African-American, Hispanic, white, and Asian students.

All of the internship group cases were matched with cases from the comparison group. The participants in both groups of the study consisted of the teachers for each of the selected classrooms and three to five students from each classroom. The observed students were randomly chosen in each class by the observer at the beginning of the observation class period (~ 50 min) in an effort to closely represent the gender and age make-up of the group. Names and any other identifying information were not collected to preserve the anonymity of the students. The classes ranged from eighth to twelfth grade and the content areas included mathematics, science, social studies, language arts, and foreign language courses.

## Instruments

Three different instruments were used during the observations to collect data about the teachers, the students, and the overall classroom environments.

**Teacher observation instrument.** The teacher observation instrument was adapted from the Teacher Roles Observation Schedule (TROS) (Waxman et al., 1988) for the authors' purposes. It consisted of behaviors and characteristics in the following categories: interactions (e.g. with student(s) – instructional, with student(s) – managerial, etc.), setting (e.g. whole class, individual, etc.), instructional orientation (e.g., direct instruction, seatwork, etc.), nature of interaction (e.g. questioning, explaining, etc.), purpose of interaction (e.g. focus on content, redirect student thinking, etc.), and instructional technology (e.g. to present material, as a communication tool, etc.). At the end of each 30 second observation cycle, the observer checked off each observed characteristic or activity. At the conclusion of the observed class period, percentages were calculated for each based on how many times it was observed out of the total number of cycles. The mean inter-rater agreement across all observers was high (0.94).

**Student observation instrument.** The student observation instrument was adapted from the Student Behavior Observation Schedule (COS) (Waxman et al., 1988) for the authors' purposes. It included characteristics and activities in the following areas: classroom setting (e.g. whole class, individual, etc.), manner (on- or off-task), types of engagement (behavioral, cognitive, and affective), interaction (e.g. with teacher – instructional, with other students, etc.), activity types (e.g. written assignment, questioning, distracted, etc.), educational use of technology (e.g. gather information,

word processing, etc.), and technology (interactive whiteboard, desktop computer, etc.). At the end of each 30 second observation cycle, the observer checked off each observed characteristic or activity. At the conclusion of the observed class period, percentages were calculated for each based on how many times it was observed out of the total number of cycles. The mean inter-rater agreement across all observers was high (0.97).

**Overall classroom observation instrument.** The overall classroom observation instrument was adapted from Part 4 of the Classroom Observation Measure (COM) (Ross & Smith, 1996) for the authors' purposes. The instrument addressed behaviors of the teachers and students as well as characteristics of the classroom environment. At the closing of each observation, the observer utilized the instrument by marking the degree to which each behavior and characteristic was observed ("not observed at all," "some extent (once or twice)," or "great extent (3 or more times)"). The mean inter-rater agreement across all observers was high (0.89).

**Data Collection**

For both groups, observation data was collected systematically over the course of single secondary class periods. The teacher and between three and five students in each classroom were observed by way of time sampling in cycles for 30 second intervals. The number of cycles ranged from five to ten depending on the length of the classes. For each cycle, the observed characteristics and behaviors were checked off and at the end of the class periods, the observer calculated and documented the percentage of the sampled time that each of those characteristics and behaviors were observed for the

individual participants. The overall classroom and CCRS instruments were immediately completed by the observer at the end of each observed class period.

## Results

### Teacher Observation

Table 3.1 reports the overall findings from the teacher observations. In the internship program classrooms, the predominant setting or context observed was whole-class instruction (59.45%), followed by individualized work (26.67%), and finally small-group instruction (7.78%) and dyads (6.47%). In these settings, direct instruction took place about 46.67% of the time, instruction was learner-centered 34.44% of the time and students participated in seatwork 17.78% of the time. The teachers interacted with their students in an instructional context (58.89%), in a managerial context (27.22%), collaboratively (10%), and in a social way (5.56%). The nature of these interactions most often involved explanation (58.33%), cueing or prompting (49.44%), and questioning (32.22%) with the purpose of focusing on content (62.78 %) or work product (20%), and connecting content to real life issues (18.33%). Instructional technology was used approximately 50% of the time, and most often with the purpose of presenting material (38.33%). It should be pointed out that the standard deviations are quite large across observed teacher behaviors and characteristics, suggesting varying degrees of variance among individual teachers in the internship group.

In the comparison group classrooms, the predominant setting or context observed was whole-class instruction (48.68%), followed by small-group instruction (29.62%), and finally individualized work (15.03%) and dyads (6.11%). In these settings, learner-

centered instruction took place about 49.63% of the time, direct instruction occurred 41.91% of the time and students participated in seatwork 5.06% of the time. The teachers interacted with their students in an instructional context (77.87%) and in a managerial context (14.33%). They did not interact with their students at all 6.56% of the time. The nature of the interactions most often involved explanation (69.01%), questioning (40.98%), and cueing or prompting (20.83%) with the purpose of focusing on content (67.88%) or work product (29.89%), and connecting content to real life issues (24.32%). Instructional technology was used approximately 38% of the time, and most often as a communication tool (38.33%) or to present material (15.57%). It should be pointed out that the standard deviations are quite large across observed teacher behaviors and characteristics, suggesting varying degrees of variance among individual teachers in the comparison group.

*Table 3.1: MANOVA and ANOVA Results for Teacher Behaviors and Interactions*

| | MANOVA | | Intern Group (n=18) | | Comparison Group (n=18) | | ANOVA |
|---|---|---|---|---|---|---|---|
| **Observation Categories** | *df* | *F* | *M* | *SD* | *M* | *SD* | *F* |
| **INTERACTIONS** | 5 | 2.60* | | | | | |
| No interaction | | | 2.78 | 8.26 | 6.56 | 11.35 | |
| Instructional | | | 58.89 | 26.10 | 77.87 | 20.86 | 5.78* |
| Managerial | | | 27.22 | 16.74 | 14.33 | 14.27 | 6.18* |
| Social/personal | | | 5.56 | 15.04 | 1.79 | 5.61 | |
| Collaborative | | | 10.00 | 20.86 | 1.11 | 4.71 | |
| **SETTING** | 5 | 1.97 | | | | | |
| Whole class | | | 59.45 | 34.38 | 48.68 | 26.22 | |
| Small group (> 2 students) | | | 7.78 | 20.74 | 29.62 | 27.09 | |
| Dyads (2 students) | | | 6.47 | 16.18 | 6.11 | 18.52 | |
| Individual | | | 26.67 | 32.90 | 15.03 | 20.81 | |
| Traveling | | | 0.00 | 0.00 | 0.56 | 2.36 | |
| **INSTRUCTIONAL ORIENTATION** | 4 | 1.27 | | | | | |
| Direct instruction | | | 44.67 | 35.65 | 41.91 | 28.20 | |
| Seatwork | | | 17.78 | 22.64 | 5.06 | 16.56 | |
| Learner-centered | | | 34.44 | 34.17 | 49.63 | 29.66 | |
| Other | | | 3.33 | 7.67 | 3.39 | 8.46 | |
| **NATURE OF INTERACTION** | 9 | 3.76** | | | | | |
| Questioning | | | 32.22 | 29.01 | 40.98 | 28.49 | |
| Explaining | | | 58.33 | 27.06 | 69.01 | 22.06 | |
| Positive Commenting | | | 4.44 | 8.55 | 9.23 | 7.73 | |
| Negative Commenting | | | 0.00 | 0.00 | 1.17 | 3.42 | |
| Neutral Commenting | | | 5.56 | 15.04 | 3.50 | 6.46 | |
| Listening | | | 3.33 | 7.67 | 16.80 | 16.44 | 9.92** |
| Cueing or prompting | | | 49.44 | 35.39 | 20.83 | 28.71 | |
| Modeling/demonstrating | | | 15.00 | 26.18 | 12.41 | 16.87 | |
| Other | | | 5.56 | 11.49 | 9.11 | 13.55 | |
| **PURPOSE OF INTERACTION** | 19 | 1.86 | | | | | |
| Focus on content | | | 62.78 | 27.40 | 67.88 | 27.94 | |
| Focus on process | | | 18.33 | 22.29 | 17.84 | 28.38 | |
| Focus on work product | | | 20.00 | 14.14 | 29.89 | 23.40 | |
| Connect content to other disciplines | | | 1.11 | 4.71 | 0.00 | 0.00 | |
| Connect content to real-life issues | | | 18.33 | 22.29 | 24.32 | 33.01 | |
| Redirect student thinking | | | 2.22 | 6.47 | 17.67 | 19.13 | |
| Show interest in student work | | | 8.89 | 17.11 | 9.64 | 11.61 | |
| Show personal regard for student | | | 5.56 | 15.03 | 2.66 | 5.29 | |
| Encourage students to help each other | | | 2.22 | 6.47 | 2.78 | 9.58 | |
| Encourage students to succeed | | | 11.76 | 15.90 | 5.18 | 9.16 | |
| Encourage students to question | | | 0.00 | 0.00 | 3.89 | 9.79 | |
| Encourage extended responses | | | 8.89 | 15.68 | 16.05 | 22.31 | |
| Encourage self-management | | | 17.22 | 11.79 | 5.68 | 8.79 | |
| Praise student behavior | | | 1.11 | 4.71 | 0.00 | 0.00 | |
| Correct student behavior | | | 13.33 | 16.80 | 2.96 | 8.23 | |
| Correct student performance | | | 0.00 | 0.00 | 5.99 | 10.73 | |
| Assess prior knowledge | | | 11.11 | 15.68 | 14.44 | 28.12 | |
| Assess new knowledge | | | 1.11 | 4.71 | 0.44 | 1.89 | |
| Other | | | 2.22 | 6.47 | 6.44 | 12.99 | |
| **INSTRUCTIONAL TECHNOLOGY** | 5 | 4.36** | | | | | |
| Use tech to present material | | | 38.33 | 33.30 | 15.57 | 19.85 | 6.21* |
| Assist students with tech | | | 7.78 | 20.74 | 1.11 | 3.23 | |
| Use tech as a communication tool | | | 2.78 | 11.79 | 16.40 | 28.78 | |
| Use tech to create | | | 0.00 | 0.00 | 0.56 | 2.36 | |
| Use tech to access the internet | | | 1.67 | 5.14 | 4.44 | 9.22 | |

*** $\underline{p} < 0.001$; ** $\underline{p} < .01$; * $\underline{p} < .05$

The Multivariate Analysis of Variance (MANOVA) results revealed a significant multivariate effect for project (i.e., internship group vs. comparison group) on the Interaction, Nature of Interaction, and Instructional Technology sections of the teacher observation instrument. Follow-up univariate tests revealed that internship group was observed significantly more (a) interacting with students in a managerial way, and (b) using technology to present material than teachers in the comparison group. On the other hand, teachers from the comparison group were observed (a) interacting with students in an instructional way, and (b) listening significantly more than the intern group.

**Student Observation**

Table 3.2 reports the overall findings from the student observations. In internship group classrooms, the predominant setting or context observed was whole-class instruction (53.1%), followed by individualized or independent work (26.21%), and small-group instruction (12.87%). In these settings, students interacted with their teacher in either an instructional or a managerial context 11.27% of the time and with others (e.g., students) 21.61% of the time. The most prevalent activity that students were observed doing was watching or listening (41.49%). The next most prevalent activities were working on written assignments (35.06%) and reading (27.01%). Students were observed being on task 77.01% of the time when they were engaged behaviorally (45.75%) or cognitively (34.26%). Interactive white boards were used 10.92% of the time, often for gathering information (17.01%). The standard deviations vary widely across the observed student behaviors for the internship group.

In the comparison group classrooms, the predominant setting or context observed was whole-class instruction (49.48%), followed by small group work (26.55%), and individual instruction (13.97%). In these settings, students interacted with their teacher in either an instructional or a managerial context 20.27% of the time and with others (e.g., students) 26.14% of the time. The most prevalent activity that students were observed doing was listening or watching (47.64%). The next most prevalent activities were working on written assignments (35.10%) and discussing (25.43%). Students were observed being on task 86.90% of the time when they were engaged behaviorally (59.05%) or cognitively (26.91%). Laptop computers were used 18.60% of the time, often for gathering information (8.20%). The standard deviations vary widely across the observed student behaviors for the comparison group.

*Table 3.2: MANOVA and ANOVA Results for Student Behaviors and Interactions*

| | MANOVA | | Intern Group (n=87) | | Comparison Group (n=61) | | ANOVA |
|---|---|---|---|---|---|---|---|
| **Observation Categories** | *df* | *F* | *M* | *SD* | *M* | *SD* | *F* |
| **SETTING** | 5 | 2.70* | | | | | |
| Whole class | | | 53.10 | 36.10 | 49.48 | 32.33 | |
| Small group (> 2 students) | | | 12.87 | 28.77 | 26.55 | 31.05 | 7.59** |
| Dyads (2 students) | | | 6.44 | 17.85 | 8.57 | 18.55 | |
| Individual | | | 26.21 | 32.47 | 13.97 | 24.91 | 6.13* |
| Other | | | 0.00 | 0.00 | 1.85 | 12.88 | |
| **MANNER** | 2 | 3.24* | | | | | |
| On-Task | | | 77.01 | 28.25 | 86.90 | 20.48 | 5.46* |
| Off-Task | | | 17.95 | 24.58 | 12.93 | 20.58 | |
| **TYPES OF ENGAGEMENT** | 3 | 2.89* | | | | | |
| Behavioral (active response) | | | 45.75 | 25.68 | 59.05 | 36.07 | 6.87** |
| Cognitive (expending mental effort) | | | 34.26 | 24.09 | 26.91 | 35.92 | |
| Affective (emotional reaction) | | | 0.23 | 2.14 | 0.88 | 3.49 | |
| **INTERACTIONS** | 5 | 2.76* | | | | | |
| No interaction | | | 67.13 | 28.40 | 52.27 | 33.47 | 8.46* |
| With teacher (instructional) | | | 9.20 | 15.42 | 13.04 | 19.22 | |
| With teacher (managerial) | | | 2.07 | 6.13 | 7.23 | 18.02 | 6.14* |
| With other students | | | 21.61 | 24.39 | 26.14 | 27.03 | |
| Other | | | .023 | 2.14 | 0.47 | 2.48 | |
| **ACTIVITY TYPES** | 16 | 2.27** | | | | | |
| Written assignment | | | 35.06 | 25.28 | 35.10 | 28.75 | |
| Assessments | | | 2.30 | 9.49 | 1.18 | 10.30 | |
| Discussing | | | 11.95 | 26.80 | 25.43 | 28.75 | 8.54** |
| Reading | | | 27.01 | 29.69 | 15.67 | 21.01 | 6.58* |
| Tutoring | | | 0.00 | 0.00 | 0.00 | 0.00 | |
| Working kinesthetically | | | 0.92 | 4.21 | 0.51 | 2.26 | |
| Answering teacher-posed questions | | | 3.56 | 10.23 | 11.81 | 22.09 | 9.31* |
| Answering peer-posed questions | | | 1.38 | 5.32 | 2.13 | 7.55 | |
| Questioning | | | 3.10 | 7.20 | 4.78 | 8.11 | |
| Presenting | | | 0.00 | 0.00 | 0.18 | 1.42 | |
| Exploration/inquiry | | | 5.06 | 14.38 | 15.81 | 25.81 | 10.49*** |
| Using concrete learning materials | | | 8.15 | 18.40 | 12.42 | 21.75 | |
| Listening/watching | | | 41.19 | 30.56 | 47.64 | 29.13 | |
| Distracted | | | 20.00 | 25.38 | 13.09 | 19.88 | |
| Acting out (behavior) | | | 0.69 | 4.77 | 0.71 | 3.29 | |
| No activity/transition | | | 2.99 | 8.09 | 2.13 | 4.53 | |
| Other | | | 4.48 | 11.98 | 4.32 | 11.33 | |
| **EDUCATIONAL USE OF TECHNOLOGY** | 6 | 4.99*** | | | | | |
| Basic skills/drill/practice | | | 1.38 | 5.32 | 2.72 | 11.38 | |
| Gather information | | | 17.01 | 23.33 | 8.20 | 14.96 | 6.74** |
| Organizing/managing/analyzing info | | | 0.69 | 4.77 | 4.23 | 9.22 | 9.27** |
| Communicating/displaying findings | | | 0.00 | 0.00 | 2.95 | 9.33 | 8.74** |
| Word processing | | | 0.00 | 0.00 | 1.64 | 12.80 | |
| Other | | | 10.99 | 21.03 | 7.47 | 22.76 | |
| **TECHNOLOGY** | 5 | 16.75*** | | | | | |
| Interactive Whiteboard | | | 10.92 | 22.55 | 4.10 | 18.20 | |
| Laptop computer | | | 0.00 | 0.00 | 18.60 | 30.19 | 33.14*** |
| Desktop computer | | | 2.30 | 15.07 | 0.00 | 0.00 | |
| Other | | | 19.89 | 21.21 | 19.79 | 30.80 | |
| Other | | | 0.46 | 3.01 | 14.04 | 23.71 | 27.97*** |

*** $p < 0.001$; ** $p < .01$; * $p < .05$

The Multivariate Analysis of Variance (MANOVA) results revealed a significant multivariate effect for project (i.e., internship group vs. comparison group) on all sections of the student observation instrument, including: setting, manner, types of engagement, interactions, activity type, educational use of technology, and technology. Follow-up univariate tests revealed that there were significant differences between internship and comparison group classes on the variables of: small group and individual settings; on-task manner; behavioral engagement; no interaction; managerial interaction with the teacher; discussing; reading; answering teacher-posed questions; exploration/inquiry; using technology to gather information, organize/manage/analyze information, and communicate and display findings; and laptop use. Students from the internship group classes were observed significantly more (a) working in an individualized setting, (b) not interacting, (c) reading, and (d) gathering information with technology. On the other hand, students from comparison group classes were observed (a) in a small-group setting, (b) on-task, (c) behaviorally engaged, (d) interacting with the teacher in a managerial context, (e) discussing, (f) answering teacher-posed questions, (g) exploring/inquiring, (h) organizing, managing, and analyzing information, (i) communicating and displaying findings, and (j) using laptop computers significantly more than students from the effective schools.

**Overall Classroom Observation**

Table 3.3 reports the overall findings from the classroom observations. In internship group classrooms, the instructional behaviors of the teachers that were observed to the greatest extent included: providing feedback (2.72/3), having warm and

supportive relationships with students (2.56/3), acting as a coach or facilitator (2.50/3), providing opportunities for problem-solving (2.50/3), and asking open-ended questions (2.50/3). The most widely observed student behaviors included: engaging in classroom activities (3.00/3), asking questions indicating reflection (2.44/3), taking responsibility or ownership of work (2.39/3), and participating in learner-centered activities (2.39/3). The most commonly noted characteristic of the classroom environment was that the transitions were quick and efficient (2.17/3). The standard deviations for all but two of the variables were less than 1, suggesting there is a relatively small variance among overall environmental characteristics from the internship group classrooms.

In comparison group classrooms, the instructional behaviors of the teachers that were observed to the greatest extent included: having warm and supportive relationships with students (2.89/3), sharing intellectual control with students (2.83/3), providing feedback (2.83/3), creating occasions for students to work out content (2.78/3), and distributing feedback evenly (2.67/3). The most widely observed student behaviors included: taking responsibility and ownership of work (2.83/3), engaging in classroom activity (2.78/3), participating in learner-centered activities (2.67/3), and offering and defending prior views (2.06/3). The most commonly noted characteristics of the classroom environment were that the transitions were quick and efficient (2.33/3) and that materials and/or manipulatives were available for practice (2.33/3). The standard deviations for all but one variable was less than 1, suggesting there is a relatively small variance among overall environmental characteristics from the comparison group classrooms.

*Table 3.3: MANOVA and ANOVA Results for Overall Classroom Environment*

| | MANOVA | | Intern Group (n=18) | | Comparison Group (n=18) | | ANOVA |
|---|---|---|---|---|---|---|---|
| **Observation Categories** | *df* | *F* | *M* | *SD* | *M* | *SD* | *F* |
| **INSTRUCTION (Teacher)** | 29 | 3.49 | | | | | |
| Shared intellectual control with students | | | 2.28 | 0.83 | 2.83 | 0.38 | |
| Created occasions for students to work out content | | | 2.06 | 1.00 | 2.78 | 0.55 | |
| Provided choice and independent decision-making | | | 2.06 | 0.94 | 2.56 | 0.70 | |
| Provided diverse ways to experience success | | | 1.56 | 0.62 | 2.11 | 0.76 | |
| Promoted talk that was exploratory, tentative, and hypothetical | | | 2.22 | 0.88 | 2.28 | 0.75 | |
| Encouraged students to learn from other students | | | 1.38 | 0.79 | 1.83 | 0.92 | |
| Built an environment that supported risk-taking | | | 2.28 | 0.83 | 2.11 | 0.76 | |
| Used intellectually challenging teaching procedures | | | 1.78 | 0.65 | 1.67 | 0.77 | |
| Used teaching procedures designed to promote quality learning | | | 2.33 | 0.69 | 2.11 | 0.83 | |
| Developed students' awareness of the big picture | | | 2.28 | 0.89 | 2.06 | 0.80 | |
| Raised students' awareness of different aspects of quality learning | | | 1.44 | 0.62 | 1.39 | 0.61 | |
| Promoted assessment as part of the learning process | | | 1.89 | 0.68 | 1.50 | 0.86 | |
| Facilitated students' activities and encouraged participation | | | 2.33 | 0.69 | 2.50 | 0.62 | |
| Linked concepts and activities together | | | 2.44 | 0.62 | 1.94 | 0.64 | |
| Applied new concepts to similar situations | | | 1.94 | 0.80 | 2.00 | 0.77 | |
| Acted as coach/facilitator | | | 2.50 | 0.71 | 2.61 | 0.70 | |
| Provided opportunities for problem-solving | | | 2.50 | 0.71 | 2.17 | 0.92 | |
| Asked open-ended questions | | | 2.50 | 0.71 | 2.56 | 0.70 | |
| Provided feedback | | | 2.72 | 0.46 | 2.83 | 0.51 | |
| Provided wait-time for student responses | | | 2.11 | 0.83 | 2.33 | 0.77 | |
| Integrated technology into the lesson | | | 2.33 | 0.69 | 2.00 | 0.91 | |
| Distributed feedback evenly | | | 2.39 | 0.70 | 2.67 | 0.59 | |
| Scaffolded/redirected student thinking | | | 2.22 | 0.65 | 2.61 | 0.61 | |
| Related concepts to real-world problems/solutions | | | 2.33 | 0.77 | 2.33 | 0.77 | |
| Used a variety of modalities | | | 1.89 | 0.76 | 1.72 | 0.89 | |
| Varied instructional styles | | | 1.94 | 0.80 | 1.61 | 0.78 | |
| Offered encouragement of students' efforts | | | 2.33 | 0.59 | 2.22 | 0.81 | |
| Had warm, supportive relationships with students | | | 2.56 | 0.62 | 2.89 | 0.32 | |
| Linked students' prior knowledge to the current lesson | | | 2.39 | 0.70 | 2.61 | 0.61 | |

*Table 3.3 Continued*

| | MANOVA | | Intern Group (n=18) | | Comparison Group (n=18) | | ANOVA |
|---|---|---|---|---|---|---|---|
| **Observation Categories** | *df* | *F* | *M* | *SD* | *M* | *SD* | *F* |
| **STUDENT** | 21 | 2.52* | | | | | |
| Offered and defended prior views | | | 1.72 | 0.83 | 2.06 | 0.87 | |
| Took responsibility/ownership of work | | | 2.39 | 0.78 | 2.83 | 0.50 | |
| Challenged/questioned content | | | 2.22 | 0.65 | 1.56 | 0.70 | 8.74* |
| Asked questions indicating reflection | | | 2.44 | 0.70 | 2.00 | 0.69 | |
| Connected ideas and concepts | | | 2.28 | 0.67 | 2.00 | 0.69 | |
| Used different ways to answer | | | 1.50 | 0.71 | 1.50 | 0.71 | |
| Used technology for problem-solving/creativity | | | 1.50 | 0.71 | 1.67 | 0.97 | |
| Used technology to learn basic skills | | | 1.28 | 0.67 | 1.17 | 0.51 | |
| Used technology to access the internet | | | 1.28 | 0.67 | 1.33 | 0.77 | |
| Engaged in classroom activity | | | 3.00 | 2.54 | 2.78 | 0.43 | |
| Activities were learner-centered | | | 2.39 | 0.70 | 2.67 | 0.69 | |
| Solved problems using real-life objects in the classroom | | | 1.50 | 0.86 | 1.17 | 0.51 | |
| Engaged in activities that integrated multiple subject-areas | | | 1.39 | 0.50 | 1.50 | 0.86 | |
| Freedom of movement and placement during activities | | | 1.61 | 0.85 | 2.00 | 0.84 | |
| **CLASSROOM ARRANGEMENT/ ENVIRONMENT** | 3 | 1.50 | | | | | |
| Materials and/or manipulatives available for hands-on practice | | | 1.72 | 0.96 | 2.33 | 0.91 | |
| Student work was displayed | | | 1.72 | 0.83 | 2.17 | 0.92 | |
| Transitions were quick and efficient | | | 2.17 | 0.62 | 2.33 | 0.69 | |
| Technology was accessible for student use | | | 1.72 | 0.89 | 2.06 | 1.02 | |

*Note: 1 = not observed at all; 2 = some extent (once or twice); 3 = great extent (3 or more times)*
*** $\underline{p} < 0.001$; ** $\underline{p} < .01$; * $\underline{p} < .05$

The Multivariate Analysis of Variance (MANOVA) results revealed a significant multivariate effect for project (i.e., internship group vs. comparison group) on Student section of the overall classroom observation instrument. Follow-up univariate tests revealed that there was a significant difference between internship and comparison group classrooms on the variable of challenged/questioned content, which was observed more often in the internship group classrooms.

## Discussion

Overall, the present study revealed that the first-year teachers in the internship group were focused on elements of classroom management through individualized settings and technology-based presentation of material. This is evidenced by their students' paucity of interactions as they predominantly participated in solitary activities. On the other hand, teachers in the comparison group were observed having more student-centered classes with a diverse range of instructional and learning practices. Their students tended to be behaviorally engaged in on-task discussions and small-group activities. These findings corroborate the common notion that first-year teachers are consumed with efforts to manage their students and their classrooms, which is consistent with previous research showing that first-year teachers are often placed in more difficult classrooms with lower-achieving students (Darling-Hammond, 2010; Darling-Hammond, 2011).

The more experienced teachers in the comparison group were more at ease with classroom management and utilized a larger and more diverse range of teaching strategies, giving the students a greater amount of autonomy and control over their own learning. The implementation of student-centered approaches, like working together in small groups on inquiry-based activities imply that with experience comes a greater understanding of what management tactics work and an expanded collection of instructional strategies.

The use of multiple observation tools to examine several facets of the classroom environment simultaneously supplied a rich, multi-dimensional conceptualization of the

student-teacher dynamics. In this case, the data collected by the different instruments substantiated and expounded upon each other, validating their respective findings.

Teacher education research has a responsibility to look specifically at the nature of field experiences (Capraro, et al., 2010), and how they contribute to the development of effective teaching practices for preservice and novice teachers. Future research should correlate findings from these classroom observation protocols with student achievement data to determine if and how teacher-student interactions and the overall classroom environment are related to student academic outcomes, further informing the responsibilities and foci of teacher education programs. By examining the pedagogy of teacher education field students and K-12 student outcome data together, classroom observation research can respond to the demands for teacher education programs to demonstrate accountability for making a difference in student learning (Zeichner, 2002). Also, due to convenience sampling, our findings are limited in their scope. Future studies should employ random sampling to explore the extent to which the observed classroom characteristics can be generalized to the larger population of first-year teachers.

Courses and field experiences prior to entering the classroom as a full-responsibility teacher should provide opportunities for application of content knowledge, pedagogical theories, and best practice methodologies in simulated and authentic naturalistic settings. In order to provide first-year teaching interns with the tools they need to establish classroom environments that facilitate quality learning, teacher education programs should scaffold these opportunities and provide feedback to correct

and affirm performance in an effort to build confidence and nurture growth. Furthermore, as these measures are taken to improve teacher preparation, programs need to incorporate more opportunities for observation as a method to provide feedback to teacher education students and novice teachers as they acclimate to their new roles and responsibilities as educators.

# 4. TECHNOLOGY INTEGRATION INTO CLASSROOM INSTRUCTION: CHANGES IN FIRST-YEAR TEACHERS' SELF-EFFICACY AND PEDAGOGY

## Introduction

Much research has been done to examine how technology is being infused into teaching and learning and to determine what effects, if any, this growing trend has on student achievement. In their 2013 meta-analysis, Lee, Waxman, Wu, Michko, and Lin synthesized 58 studies over the past 15 years to examine the effects of teaching and learning with technology on student outcomes. Overall, they found that technology integration in classroom instruction has positive effects on both students' cognitive and affective outcomes. They also suggested that the impact of technology on student outcomes increases as new developments in technology emerge and it becomes more prevalent in classroom pedagogy (Lee et al., 2013).

The integration of technology into the classroom provides teachers with more numerous and flexible ways to share information (Campbell & Martin, 2010) and allows students to become more proactive in their learning experience as their intellectual engagement with their world beyond the classroom is deepened (Ma, Andersson, & Streith, 2005; Nickerson & Zodhiates, 2013). Teacher technology use generally includes: instructional planning and preparation, information presentation, instructional accommodation and modification, professional communication, and directing and assisting students with technology for specific instructional purposes (Ottenbreit-Leftwich, et al., 2012; Russell, Bebell, O'Dwyer, & O'Connor, 2003). Through

technology use, students can conceptualize and actualize ideas in ways that are not otherwise possible (Cuban, Kirkpatrick, & Peck, 2001) through the creation of links between the classroom and outside environments not previously as accessible (Nickerson & Zodhiates, 2013). Technology-driven lessons tend to require students to produce representations of their knowledge and understanding, often making them more student-centered than traditional lessons that do not include technology components (Inan, Lowther, Ross, & Strahl, 2010; Lowther, Ross, & Morrison, 2003).

The infusion of technology into the learning environment can ease interaction, communication, and collaboration between students. Technology allows for digital convergence (Campbell & Martin, 2010) where a single device, like an interactive whiteboard or a tablet, can combine the features and abilities of several devices into a simplified device or system, digitizing teaching and learning. Increased access to technology creates a more active learning environment, increases student engagement, improves student proficiency at using technology as a learning tool (Lowther, Ross, & Morrison, 2003), encourages intellectual exchanges, and allows students to solve complex problems not otherwise accessible (Nickerson & Zodhiates, 2013). The goal of technology integration into the classroom is to improve student learning, but simply using the technology will not guarantee improved student learning (Lei & Zhao, 2007). Instead, it must be used in a purposeful and deliberate way, in tandem with content and pedagogy (AACTE Committee on Innovation and Technology, 2008), to redesign and transform learning tasks into those previously inconceivable (Puentedura, 2013).

## Preservice Teacher Preparation for Technology Integration

Preservice teachers should receive training on how to effectively use technology and integrate it into their teaching. Since the quality of technology use is more critical to student learning than quantity is (Lei & Zhao, 2007), there has been an ongoing effort to improve teachers' use of technology in the classroom (Campbell & Martin, 2010; Clausen, 2007). This emphasis has generated numerous studies and recommendations regarding the importance of teacher preparedness and belief in technology incorporation as well as best practices for preparing new teachers to meaningfully integrate technology into their teaching.

Preservice teacher education should focus on teachers' pedagogical readiness and beliefs regarding technology integration as well as basic technology competencies and skills (Inan, Lowther, Ross, & Strahl, 2010). The teachers' overall developmental process includes their own K-12 experiences as students, their teacher education coursework, their preparatory field experiences, and their induction and early career teaching experiences (Feiman-Nemser, 2011). Although new teachers often have excellent technology for their own personal or professional practice, they typically struggle with how to integrate technology into their instruction. Historically, early career teachers tend to question the effectiveness of using technology for instructional purposes because they believe that use of technology in the classroom increases classroom management issues (Russell et al., 2003). To combat this resistance, they should acquire the knowledge and skills that will help them figure out how technology

can function within their own pedagogy and in what capacity to most effectively influence positive student learning outcomes (Inan et al., 2010). Their attitudes and beliefs toward technology, as well as how they are prepared to use it in the educational context and to what degree (Ottenbreit-Leftwich, et al., 2012), greatly influence how they adopt and use it in their classrooms (Russell et al., 2003).

The potential of technology integration into classroom teaching and learning cannot be fully realized unless teachers recognize the relevance of technology resources to issues they encounter in their own classrooms (Ottenbreit-Leftwich, et al., 2010) and are adequately trained and prepared to effectively use it for instructional purposes (Russell et al., 2003). Teacher preparation programs should help preservice teachers determine how to use technology to solve instructional problems and what specific technology can be used to do so (Ottenbreit-Leftwich, et al., 2012). This can be accomplished through the inclusion of training for integrating technology into pedagogy (Lee, Waxman, Wu, Michko, & Lin, 2013) by introducing teachers to technology devices and applications that are available for classroom use so that they can become conversant and aware of how it can affect their professional practice (Campbell & Martin, 2010; Russell et al., 2003). This introduction should occur gradually and with continued support (Inan et al., 2010) as teacher educators model effective technology use and integration into their own instruction (Campbell & Martin, 2010). Once teachers are comfortable with basic integration, training should focus on how technology can enhance student-centered learning through collaboration, higher-order thinking, and scaffolded student independence (Inan et al., 2010). Teachers' perception of

technology's usefulness and ease of use are key determinants of their intention to integrate technology into their instruction and its use in the classroom (Ma, Andersson, & Streith, 2005)

**School Contexts for Technology Integration**

For the past two decades, federal policy has reflected a commitment to technology integration in classrooms through the development and implementation of student technology use standards (U. S. DOE, 1996, 2001, 2003). This national push for increased technology availability and use has not led to improvement in technology-rich pedagogy; computers and other devices continue to be mainly used to present content, for drill and practice, or for educational games (Inan et al., 2010). This assertion has been supported by studies indicating that the internet browser is the most commonly observed computer application, along with word processing and presentation tools (Inan et al., 2010; Lei & Zhao, 2007).

Clausen (2007) reports the International Society for Technology in Education (ISTE)'s list of essential teacher education and school contexts for effective technology use by beginning teachers, which includes: a shared vision for technology's role in education, access to the necessary technology, educators skilled in content and instructional knowledge, professional development for effective integration, technical assistance for technology use, content standards and curriculum resources to guide instructional planning and delivery, student-centered teaching methodology, assessment, community support for technology-driven pedagogy, and campus and district policies that support technology use. School contexts that support and value instructional

technology use increase the chances that new teachers who were equipped by their preparation programs to use technology, will do so (Clausen, 2007). This increased access to technology lets students pursue learning beyond the walls of the classroom, allowing them to keep up with the growing social and professional demands for success (Collins & Halverson, 2009).

**Challenges to Technology Integration for First-Year Teachers**

For effective implementation of technology, teachers need: proper training and support, confidence in their own ability to use technology to enhance their pedagogical practice and students learning, and time to develop effective technology-driven lessons (Campbell & Martin, 2010). Vannatta and Fordham (2004) found that higher levels of classroom technology use is best predicted by the amount of technology training a teacher receives as well as the amount of time the teacher spends outside the classroom preparing for instruction, and the teacher's openness to change, regardless of teaching philosophy or self-efficacy for teaching. Though access, training, and policy have become more supportive of technology integration in the classroom, high-quality use has remained low, suggesting the presence of other barriers, like teachers' pedagogical beliefs (Ertmer, 2005).

The first year of teaching is a period of survival and adaptation as novice teachers engage in trial-and-error regarding instructional practices, classroom management, and curriculum development while reconciling their own personal views and ideals with reality (Clausen, 2007). First-year teachers tend to view technology as

separate from their regular instructional practices and therefore feel it is an additional step to integrate it into instruction, limiting its use (Clausen, 2009).

**Self-Efficacy and Novice Teachers**

The first year of teaching involves a steep learning curve accompanied by high emotions. Novices spend the year focused on survival and discovery as they encounter reality shock, a struggle to endure, and loss of idealism (Feiman-Nemser, 2003). Teachers have the most difficulty in their first year in the field and they leave their preparation programs with high levels of concern regarding their abilities to teach (Adam, 1982; Day & Guo, 2010). However, despite how difficult they tend to feel the job is, their self-efficacy for negotiating the challenges that it presents generally increase by the end of the first year (Smeaton & Walters, 2013). They are challenged by reconciling the demands and reality of teaching with their own ideals, beliefs, and practices (Flores & Day, 2006).

Though teachers' beliefs regarding their abilities are based on their previous experiences, successes, and challenges, their feelings of self-efficacy affect their future classroom behaviors, which are linked to student outcomes (Tschannen-Moran & Johnson, 2011; Darling-Hammond, Chung, & Frelow, 2002). More specifically, teachers' self-efficacy refers to their belief that they have the knowledge and skills necessary to have a positive effect on student outcomes (Daniels, et al., 2011; Tschannen-Moran & Woolfolk Hoy, 2001). In the case of preservice teachers, the way they perceive their teaching skills transforms how they self-actualize as inservice teachers (Tschannen-Moran & Johnson, 2011). Their fit perceptions, or the extent to

which they perceive that their abilities meet the demands of the profession, foster confidence and influence their anticipated performance (Conklin, Dahling, & Garcia, 2012; Wessel, Ryan, & Oswald, 2008). The resulting feelings of self-efficacy most malleable during teacher preparation and the early stages of the career, but they solidify as experience accumulates (Klassen & Chiu, 2010).

The teacher's professional identity plays a large role in self-efficacy (Day, et al., 2006). Three of the main influences on teachers' professional identities include: prior influences (past experiences as students), initial teacher training and practice (motivations for becoming a teacher and related learning experiences), and contexts of teaching (classroom practices, school culture, and campus leadership) (Flores & Day, 2006). Feelings of self-efficacy are based on past performance in relevant settings, motivation to succeed, and context (Lent & Brown, 2006). They are most malleable during teacher preparation and the early stages of the career, but they solidify as experience accumulates (Klassen & Chiu, 2010).

According to Social Cognitive Theory, self-efficacy beliefs are key determinants of thought and action (Lent & Brown, 2006). Self-efficacy influences teacher effectiveness, especially for first-year teachers (Fox & Peters, 2013). Effective programs increase self-efficacy, job satisfaction, and retention of new teachers (Ingersoll & Smith, 2004), implying that for teachers to remain in the field long enough to maximize their effectiveness, they ought to start out with strong and sustainable confidence levels that can fuel persistence and resilience. By promoting preservice and novice teachers' self-efficacy, teacher education programs contribute to the necessary

can-do attitudes (Weber, Hodges, & Waxman, 2013) for developing the grit and persistence necessary for developing effective technology integration practices.

**Purpose of the Study**

Although there have been many studies that have investigated preservice teachers perceptions of (a) usefulness of technology, (b) attitudes toward computer use, and (c) self-efficacy in using technology (Teo, 2010; Whitacre & Pena, 2011), there have been very few studies that have actually observed the extent to which novice teachers use technology in their classrooms. Most studies assessing technology use have relied on self-report data from administrators or teachers (e.g., McKinney, Chappell, Berry, & Hickman, 2009; Vannatta & Fordham, 2004). These types of data are often unreliable and tend to be upwardly biased in the direction of over reporting the actual amount of technology use (Cuban, 2001). Few researchers have actually gone into classrooms to see how teachers and students actually use technology daily (Cuban, 2001). There have only been a few studies that have used systematic classroom observations to investigate technology use in classrooms (Padrón, Waxman, Lee, Lin, & Michko, 2102; Waxman, Evans, Boriack. & Kilinc, 2013), but these studies have not focused on first-year teachers.

Observation research allows for the study of naturalistic classroom settings to collect detailed information regarding any number of educational components, including student-teacher interactions (Pianta, la Paro, Payne, Cox & Bradley, 2002), instructional quality (Stuhlman & Pianta, 2009), specific teaching and learning behaviors (Waxman, Padrón, Franco-Fuenmayor & Huang, 2009), and technology integration (Inan, Lowther,

Ross & Strahl, 2010). Classroom observation protocols focus solely on the aspects of teaching and learning that can be reliably observed and assessed (Hamre et al., 2013). In the present study, we used the *T3 Overall Classroom Observations Measure* to answer the following questions: (1) what technology is available in the secondary classrooms of first-year teachers?; (2) to what extent is the available technology used by first-year secondary teachers?; (3) how do first-year secondary teachers integrate technology into their instruction?; and (4) how do secondary students in the first-year teachers' classrooms use technology?

To provide a more complete picture of the first-year teachers' interactions with instructional technology, we used the *TAMU Collaborative Cohort Survey* to examine how self-efficacy for using technology to support teaching and learning varies at four points across our participants' education and induction year: (a) the first day of their summer methods courses, (b) the last day of their summer methods courses, (c) November of their first year of teaching, and (d) April of their first year of teaching.

## Methods

### Participants

Each of the 30 participants was a first-year intern teacher as well as a student in a Master of Education program with an embedded secondary initial teaching certification at a large research-based university in Texas. The certification portion of the program includes three teaching methods-based graduate courses that are taken during a single summer, followed by a year-long paid internship at a state-accredited and -subsidized secondary school of the teacher's choice. The teachers are responsible for finding and

procuring their own internship positions with support and guidance from the program faculty and staff. Technology training is a key component in the certification program, and each candidate is issued an iPad at the beginning of training for use in their own teaching practice. The interns held teaching positions at a variety of middle and high school campuses in both rural and urban areas across the state. Their teaching assignments varied, including English/language arts/reading, mathematics, social studies, science, foreign language, and professional communication from grades eight through twelve.

**Instruments**

The *T3 Overall Classroom Observation Measure* was adapted for the present study from the *Classroom Observation Measure* (COM) (Ross & Smith, 1996), which measures the extent to which various instructional strategies are observed throughout the course of a single class period. The *T3* instrument includes an inventory of what technology is available in the classrooms and the extent of its use as well as items that address the technology use and instructional behaviors of both teachers and students. At the beginning of the observed class period, the observer surveyed the classroom and indicated what types of technology were available and in what quantity. At the closing of each observation, the observer indicated the degree to which each type of technology was integrated into the teaching and/or learning and to what extent each type of technology use and instructional behavior occurred (1 = "not observed at all," 2 = "some extent (once or twice)," or 3 = "great extent (3 or more times)"). At this point, the observer also rated the classroom on its overall implementation of technology, using a 5-

point scale (0= no use of technology; 1=low-level use of technology; 2=somewhat meaningful use of technology; 3=meaningful use of technology; 4=very meaningful use of technology). The mean inter-observer agreement across all observers was high ($\kappa$ = 0.87).

The *TAMU Collaborative Cohort Survey* includes two sections of Likert-type items addressing the respondents' confidence in their ability to successfully fulfill an array of teaching-related responsibilities, integrate the cross-disciplinary state standards, and incorporate technology into their instruction. The participants were asked to rate their confidence for each item on a four-point scale (1 = "not at all confident," 2 = "somewhat confident," 3 = "confident", and 4 = "extremely confident"). This study focuses on Part V of the survey, which includes 39 items related to technology use, like: "find resources for classroom lessons," "connect an iPad to a projector for whole group learning using various educational apps," and "audio/video record lectures for students to reference."

**Data Collection**

The observation data was collected systematically over the course of single secondary class periods. These class periods were typically 50 minutes with a range of 45 to 90 minutes, depending on grade level and campus schedule. Each teacher and classroom was observed twice: once during the Fall semester and once during the Spring semester. Different class periods were observed each semester for all of the teachers.

Researchers surveyed the cohort of students over the course of the certification program to examine their level of self-efficacy for using technology to support teaching

and learning. Surveys were administered at four different critical points: (a) on the first day of the summer methods courses; (b) on the last day of the summer methods courses; (c) in November of the internship teaching year; and (d) in April of the internship teaching year.

## Results

### Classroom Observations

To examine the (a) technology available, (b) use of the available technology, (c) teacher use of technology, (d) student use of technology, (e) teacher instructional behavior, (f) student instructional behavior, and (g) the rating for overall use of technology across the fall and spring semesters, a MANOVA and an ANOVA was conducted for each section. Changes from fall to spring captured any significant growth in technology use and instructional behaviors observed across the thirty teachers and their classrooms.

Table 4.1 reports on the technology available in the 30 observed classrooms. Overall, the predominant type of technology available was laptop computers ($M$=3.57, $SD$=8.63), followed by desktop computers ($M$=2.83, $SD$=6.20), and finally tablets/smartphones ($M$=2.23, $SD$=6.43). Two noteworthy things should be pointed out: (a) overall there was limited availability of technology, and (b) the standard deviations for several of the items are large due to the large variation of available technology across teachers' classrooms. Generally, the devices accessible for teacher and student use remained constant across the school year. Some devices intended for individual use, like mp3 players/iPods and DVDs/CDs and headphones, varied slightly in observed

availability across the two semesters due to whether or not they were being used in the classroom and therefore were visible to the observer. Other larger devices, like interactive whiteboards/SMART boards, laptop and desktop computers, televisions, document readers, and projectors, varied in availability across the two semesters because several of the teachers floated to different classrooms or held a class in either the library or the computer lab. Regardless of these small variations, there were no significant differences between semesters regarding the availability of technology.

*Table 4.1: MANOVA and ANOVA Results Between Semesters for Available Technology*

| | | | **Fall, 2013** | | **Spring, 2014** | |
|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* |
| **Technology Availability** | 9 | 1.129 | | | | |
| MP3 player/iPod | | | 0.13 | 0.35 | 0.00 | 0.00 |
| Interactive whiteboard/SMART board | | | 0.40 | 0.50 | 0.37 | 0.49 |
| DVDs/CDs & headphones | | | 0.03 | 0.18 | 0.00 | 0.00 |
| Laptop computer | | | 2.43 | 7.51 | 4.70 | 9.61 |
| Desktop computer | | | 2.30 | 4.43 | 3.37 | 7.62 |
| Television | | | 0.13 | 0.35 | 0.20 | 0.41 |
| Document reader | | | 0.43 | 0.57 | 0.53 | 0.51 |
| Projector | | | 0.70 | 0.47 | 0.87 | 0.35 |
| Tablet/smartphone | | | 1.43 | 4.99 | 3.03 | 7.60 |

*Note: The "Tech Availability" items represent the actual number of specific types of technology observed in the classroom.*

Table 4.2 reports the overall findings for use of the available technology. There are no significant differences in average use for any device between the fall and spring semesters. Overall, projectors were the device most frequently used (*M*=1.93, *SD*=0.76), as they were used in tandem with both desktop (*M*=1.88, *SD*=0.72) and laptop (*M*=1.47, *SD*=0.77) computers, as well as document readers (*M*=1.28, *SD*=0.61). Interactive

whiteboards/SMART boards (*M*=1.37, *SD*=0.71) were also used with some of the projectors, but very rarely were their unique capabilities utilized; they were predominantly used as simply screens to project material on to.

*Table 4.2: MANOVA and ANOVA Results Between Semesters for Technology Use*

| | | | **Fall, 2013** | | **Spring, 2014** | |
|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* |
| **Technology Use** | 8 | 0.922 | | | | |
| MP3 player/iPod | | | 1.20 | 0.55 | 1.00 | 0.00 |
| Interactive whiteboard/SMART board | | | 1.47 | 0.78 | 1.27 | 0.64 |
| Laptop computer | | | 1.40 | 0.72 | 1.53 | 0.82 |
| Desktop computer | | | 1.90 | 0.71 | 1.87 | 0.73 |
| Television | | | 1.03 | 0.18 | 1.03 | 0.18 |
| Document reader | | | 1.27 | 0.58 | 1.30 | 0.65 |
| Projector | | | 1.93 | 0.78 | 1.93 | 0.74 |
| Tablet/smartphone | | | 1.23 | 0.57 | 1.40 | 0.72 |

*Note: All "Technology Use" items used the following key: 1=not observed at all; 2=some extent (once or twice); 3=great extent (3 or more times).*

Table 4.3 displays the overall findings regarding teacher use of technology. Overall and across the two semesters, the most commonly observed variables were teacher integrated technology into lesson (*M*=2.25, *SD*=0.70) and teacher used technology to display material/assignment (*M*=2.13, *SD*=0.72).

*Table 4.3: MANOVA and ANOVA Results Between Semesters for Teacher Use of Technology*

| | | | Fall, 2013 | | Spring, 2014 | |
|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* |
| **Teacher Use of Technology** | 9 | 1.473 | | | | |
| Teacher integrated technology into lesson | | | 2.23 | 0.68 | 2.27 | 0.74 |
| Teacher assisted students with technology | | | 1.13 | 0.51 | 1.47 | 0.78 |
| Teacher used technology as a communication tool (e.g., Skype, email/chat) | | | 1.10 | 0.31 | 1.00 | 0.00 |
| Teacher used technology to create lessons | | | 1.13 | 0.35 | 1.13 | 0.34 |
| Teacher used technology to access the internet | | | 1.17 | 0.46 | 1.30 | 0.60 |
| Teacher used technology to display material/assignment | | | 2.23 | 0.73 | 2.03 | 0.72 |
| Teacher used technology to assess/correct assignment | | | 1.00 | 0.00 | 1.13 | 0.34 |
| Teacher used technology as a communication tool | | | 1.10 | 0.40 | 1.10 | 0.40 |

*Note: All "Teacher Use of Technology" items used the following key: 1=not observed at all; 2=some extent (once or twice); 3=great extent (3 or more times).*

Table 4.4 reports the overall findings for the students' use of technology. The Multivariate Analysis of Variance (MANOVA) results revealed a significant multivariate effect for semester. Follow-up univariate tests revealed that the students (a) used technology to access the internet, (b) used technology for assessment purposes, and (c) used technology to produce new knowledge to a significantly greater extent during the spring semester than they did during the fall. This shift indicates that the teachers began to integrate the technology in more diverse and student-centered ways as their experience, and presumably their comfort level, with doing so began to increase.

Though these three uses increased from the first to the second semesters, across the entirety of the school year, the students consistently and predominantly used technology to learn basic skills through drill and practice.

*Table 4.4: MANOVA and ANOVA Results Between Semesters for Student Use of Technology*

| | | | **Fall, 2013** | | **Spring, 2014** | | |
|---|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* | *F* |
| **Student Use of Technology** | 8 | 3.354* | | | | | |
| Students used technology to enhance problem solving/creativity | | | 1.17 | 0.53 | 1.23 | 0.63 | |
| Students used technology to learn basic skills (e.g., tutorials, drill, & practice) | | | 1.83 | 0.79 | 1.57 | 0.73 | |
| Students used technology to access the internet | | | 1.07 | 0.37 | 1.57 | 0.86 | 8.62** |
| Students used technology as a communication tool (e.g., Skype, email/chat) | | | 1.03 | 0.18 | 1.00 | 0.00 | |
| Students used technology for word processing | | | 1.03 | 0.18 | 1.10 | 0.40 | |
| Students used technology for assessment purposes (e.g., individualized tracking , Accelerated Reader) | | | 1.00 | 0.00 | 1.23 | 0.63 | 4.167* |
| Students used technology for independent inquiry/research | | | 1.13 | 0.51 | 1.30 | 0.76 | |
| Student used technology to produce new knowledge | | | 1.07 | 0.37 | 1.40 | 0.77 | 4.589* |

*Note*: *All "Student Use of Technology" items used the following key: 1=not observed at all; 2=some extent (once or twice); 3=great extent (3 or more times).*
** $p < .05$*

Table 4.5 reports the overall findings for the teachers' instructional behaviors. The Multivariate Analysis of Variance (MANOVA) results demonstrated a significant multivariate effect for semester. Follow-up univariate tests revealed that the teachers used a variety of modalities, including auditory, visual, and movement significantly more during the fall semester than they did during the spring, indicating that they reduced the amount that they varied their instructional modes during a single class period. The rest of the teachers' instructional behaviors remained fairly constant across the school year and there were significant differences. The year total means reveal that the most commonly observed teacher instructional behaviors were: (a) teacher allowed students to develop concepts or procedures ($M$=2.60, $SD$=0.59), (b) teacher asked many open-ended questions ($M$=2.70, $SD$=0.53), (c) teacher provided adequate feedback to students ($M$=2.77, SD=0.46), and (d) teacher appeared to have warm, supportive relationships with students ($M$=2.72, $SD$=0.49).

*Table 4.5: MANOVA and ANOVA Results Between Semesters for Teacher Instructional Behaviors*

| | | | Fall, 2013 | | Spring, 2014 | | |
|---|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* | *F* |
| **Teacher Instructional Behaviors** | 14 | 2.017* | | | | | |
| Teacher actively facilitated students' engagement in activities and lessons to encourage participation | | | 2.57 | 0.57 | 2.53 | 0.57 | |
| Teacher applied new concepts to similar situations (elaborated) | | | 2.00 | 0.69 | 1.80 | 0.66 | |
| Teacher connected ideas and concepts | | | 2.57 | 0.57 | 2.40 | 0.67 | |
| Teacher acted as coach/facilitator | | | 2.63 | 0.56 | 2.50 | 0.57 | |
| Teacher allowed students to develop concepts or procedures | | | 2.57 | 0.57 | 2.63 | 0.61 | |
| Teacher provided students opportunities for problem solving | | | 2.40 | 0.50 | 2.37 | 0.67 | |
| Teacher asked many open-ended questions | | | 2.80 | 0.41 | 2.60 | 0.62 | |
| Teacher provided adequate feedback to students (answers, information, etc.) | | | 2.83 | 0.46 | 2.70 | 0.47 | |
| Teacher provided direct instruction for the entire class | | | 2.00 | 0.64 | 1.87 | 0.63 | |
| Teacher related concepts to students' actual lives | | | 2.23 | 0.77 | 2.03 | 0.72 | |
| Teacher used a variety of modalities, including auditory, visual, and movement | | | 2.27 | 0.64 | 1.83 | 0.70 | 6.275* |
| Teacher varied styles of conversation and participation to include students' cultural preferences | | | 2.03 | 0.76 | 2.20 | 0.61 | |

*Table 4.5 Continued*

| | | | Fall, 2013 | | Spring, 2014 | | |
|---|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* | *F* |
| **Teacher Instructional Behaviors** *(Continued)* | 14 | 2.017* | | | | | |
| Teacher offered encouragement to students' efforts that increased students' involvement and persistence | | | 2.57 | 0.63 | 2.57 | 0.63 | |
| Teacher appeared to have warm, supportive relationships with students | | | 2.63 | 0.55 | 2.80 | 0.41 | |

*Note: All "Teacher Instructional Behaviors" items used the following key: 1=not observed at all; 2=some extent (once or twice); 3=great extent (3 or more times).*
** $p < .05$*

Table 4.6 displays the overall findings for student instructional behaviors. There are no significant differences between the fall and spring semesters in this area. The most commonly observed variables across the school year were: (a) students initiated and assumed responsibility for learning activities (*M*=2.58, *SD*=0.53), (b) students were engaged in classroom activities (*M*=2.58, *SD*=0.53), and (c) students' activities were learner-centered (*M*=2.63, *SD*=0.58).

*Table 4.6: MANOVA and ANOVA Results Between Semesters for Student Instructional Behaviors*

| | | | Fall, 2013 | | Spring, 2014 | |
|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* |
| **Student Instructional Behaviors** | 6 | 0.669 | | | | |
| Students initiated and assumed responsibility for learning activities | | | 2.57 | 0.57 | 2.60 | 0.50 |
| Students connected ideas and concepts | | | 2.37 | 0.56 | 2.37 | 0.56 |
| Students utilized different ways to answer | | | 2.00 | 0.79 | 1.87 | 0.73 |
| Students were engaged in classroom activities | | | 2.57 | 0.57 | 2.60 | 0.50 |
| Students' activities were learner-centered | | | 2.53 | 0.68 | 2.73 | 0.45 |
| Students solved problems using real objects in the classroom environment | | | 1.43 | 0.68 | 1.37 | 0.67 |

*Note: All "Student Instructional Behaviors" items used the following key: 1=not observed at all; 2=some extent (once or twice); 3=great extent (3 or more times).*
** $p < .05$*

Table 4.7 displays the analysis of variance (ANOVA) results for the quality rating addressing the overall use of technology. There is a significant difference between the two semesters, with a medium effect size ($\eta_p^2 = .082$), demonstrating movement toward more meaningful use of technology in the observed classrooms.

*Table 4.7: ANOVA Results Between Semesters for Overall Use of Technology*

| | | | Fall, 2013 | | Spring, 2014 | |
|---|---|---|---|---|---|---|
| | *df* | *F* | *M* | *SD* | *M* | *SD* |
| **Overall use of technology** | 1 | 5.206* | 1.53 | 1.04 | 2.20 | 1.21 |

*Note: The "Overall Use of Technology" item used the following key: 0=no use of technology; 1=low-level use of technology; 2=somewhat meaningful use of technology; 3=meaningful use of technology; 4=very meaningful use of technology.*
** $p < .05$*

**Self-Efficacy Survey**

To determine how self-efficacy for using technology to support teaching and learning varies across the participants' education and induction year, the 39 survey items of interest were first isolated and reduced to six components through exploratory Principal Components Analysis with a Varimax rotation. Small coefficients below .40 were suppressed to minimize the number of variables that loaded on multiple components. After examining the resulting six components, we focused on one that captured the use of technology to support teaching and learning, through the inclusion of 23 survey items. This factor explains 47.670% of the total variance in survey responses. The reliability of the scale or scales is also good at .974. The remaining factors were not included in this study because they included items that addressed general technology use (not specific to the classroom environment for teaching and learning process). Table 4.8 shows the factor loadings for the component of interest.

*Table 4.8: Factor Loadings of Using Technology to Support Teaching and Learning Survey Items*

| Survey Item | Using Technology of Teaching and Learning |
|---|---|
| Lesson planning | .497 |
| Collaborate with other teachers | .558 |
| Create a class video with the entire class | .554 |
| Use the maps app for instant field trips | .573 |
| Play audio books for the entire class | .653 |
| Download free books to share in small group sessions | .685 |
| Use the camera to take pictures and create a writing assignment using the pictures | .651 |
| Connect an iPad to a projector for whole group learning using various educational apps | .839 |
| Connect an iPad to a projector to stream videos for the whole class | .835 |
| Connect an iPad to a projector to share student presentations | .835 |
| Use with an individual student who needs extra practice | .728 |
| Use content specific apps for classroom lessons | .777 |
| Use teacher apps to track student behavior | .800 |
| Use as remediation for high/low students | .760 |
| Practice test questions for an upcoming exam | .875 |
| Play a trivia game with the entire class | .827 |
| FaceTime with another classroom | .578 |
| FaceTime with an expert in the field | .635 |
| Use the calendar to add classroom events and display on the projector each day | .782 |
| Audio/video record lectures for students to reference | .716 |
| Assist in managing IEP requirements for special education students | .756 |
| Create mind maps with entire class | .746 |
| Use iPad for assessing student learning | .817 |
| **Cronbach's alpha** | 0.974 |
| **Total Variance Explained (%)** | 47.670 |

Based on the PCA outcome, the 23 items from the component were average to create a composite variable "using technology to support teaching and learning." We used analysis of variance (ANOVA) and a follow-up Tukey post hoc test to explore any

shifts in the teachers' self-efficacy due to time and experience across the four survey administrations (see Table 4.9).

*Table 4.9: ANOVA and Follow-Up Tukey Post Hoc Results for "Using Technology to Support Teaching and Learning"*

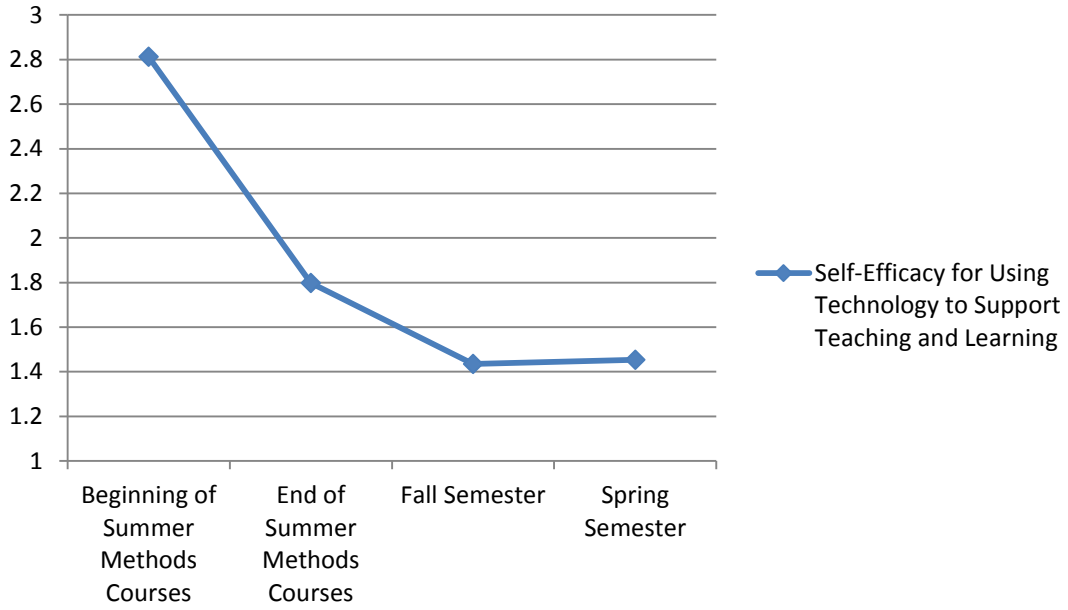
| | **Beginning of Summer Methods Courses** | | **End of Summer Methods Courses** | | **Fall Semester of internship year** | | **Spring Semester of internship year** | | |
|---|---|---|---|---|---|---|---|---|---|
| | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *F* |
| Using Technology to Support Teaching and Learning | 2.813[a] | 0.389 | 1.798[b] | 0.730 | 1.435[b] | 0.508 | 1.453[b] | 0.683 | 43.060*** |

*Note: 1 = "not at all confident," 2 = "somewhat confident," 3 = "confident", and 4 = "extremely confident".*
*** $p < 0.001$

The Analysis of Variance (ANOVA) results revealed a significant effect over time (i.e., beginning of summer methods courses, end of summer methods courses, fall of internship year, and spring of internship year), and the follow-up Tukey post hoc indicated that while there were no significant differences between the teachers' self-efficacy at the end of the summer courses, the Fall semester, and the Spring semester, the were significantly more confident at the beginning of the summer courses. The teachers started the program rating their comfort level with using technology to support teaching and learning as almost "confident" but dropped to less than "somewhat confident" at the end of the summer methods and courses and then even closer to "not at

all confident" by the end of the fall semester. By the end of the spring semester, their self-efficacy began to slightly increase again (see Figure 4.1).

*Figure 4.1: Self-Efficacy for Using Technology to Support Teaching and Learning Changes Across Survey Administrations*




## Discussion

Many factors affect how and to what extent technology is implemented in the classroom, such as: availability and access; teachers' attitudes toward integration and perception of technology's importance, usefulness, and ease of use in the learning environment; and teachers' perceptions of their own competence with regard to technology integration (Ma, Andersson, & Streith, 2005). Effective integration is especially challenging for first-year teachers because there are many personal,

contextual, and professional issues that affect, when, and how first-year teachers integrate technology into their pedagogical routines (Clausen, 2007).

The current study demonstrated fairly consistent use of technology across the Fall and Spring semesters. While the available devices varied somewhat widely from classroom to classroom, laptop and desktop computers as well as projectors were dominantly used. When technology was integrated into the instruction, it was largely used by teachers as a simple content delivery tool for students to take notes and attempt practice problems. Technology use was rarely student-centered, as students had little opportunity for individualized use for exploration or inquiry, or even to produce new knowledge or create products with technology. These findings may be attributed to the students' limited access to individual technology devices and applications; however, that is not the only explanation. Teachers ought to be willing to not only participate in technology training, but also they should commit time and effort to explore the technology and figure out how to best use it in their own classrooms (Vannatta & Fordham, 2004). The first year of teaching is often an overwhelming experience in itself as novice teachers are inundated with challenges related to instruction and classroom management. While they are focused on managing that induction year, they may not see technology training, practice, and lesson development as primary concerns.

Although the way technology was accessed and used remained generally constant across the school year, the quality of the overall use of technology improved from the Fall to the Spring semester. In the Fall, the novice teachers were between "low-level use of technology" and "somewhat meaningful use of technology." In the

Spring, the teachers were transitioning beyond "somewhat meaningful use of technology" toward "meaningful use of technology." This progress indicates increased familiarity and comfort with their role as teacher as well as with technology integration itself, demonstrating a willingness to make changes and take instructional risks as part of the learning process (Vannatta & Fordham, 2004).

Self-efficacy is not fixed and can change with experiences of perceived success or failure and mastery experiences, among other factors (Bandura, 1977). The first year of teaching can be an emotional roller-coaster as novice teachers are confronted with reconciling their own ideals, and values based on past experiences as students and in their teacher education programs with the reality of the responsibilities and expectations associated with teaching. Effective technology integration is especially challenging for first-year teachers because there are many personal, contextual, and professional issues that affect when and how teachers integrate technology into their pedagogical routines (Clausen, 2007).

The results of this study show how volatile new teachers' self-efficacy for using technology to support teaching and learning is as they navigate their induction into the teaching field. We found that self-efficacy in this area is challenged as the expectations for educational technology use are clarified through preservice education and experience in the field. The abrupt clash between what they believed they knew and were capable of and the reality of learning-through-doing proved challenging and, to a certain degree, demoralizing. The slight increase in self-efficacy scores in the spring semester imply that confidence does come with experience. Our findings have implications for the field

of teacher preparation as they highlight the importance of not only building preservice teachers' self-efficacy for using technology as a tool for teaching and learning, but also of raising their awareness of the challenges that come with entering the teaching profession.

In our technology-driven world, all students, including those in teacher preparation programs, need to have the opportunity to learn to be tech-savvy and to adapt to the evolving demands of our social and professional worlds. To this end, it is important that researchers continue to explore the nature of preparing new and experienced teachers to integrate technology into their classroom pedagogy, while school districts and campuses should seek out ways to increase access for teachers and students alike. It is vital for teacher educators to prepare future teachers to use technology to facilitate 21st Century learning for their students. To do so, they need to understand how technology is used in schools and what effects those uses have, both good and bad, to ensure that students are using it in ways that are meaningful (Lei & Zhao, 2007). Teacher educators should make a conscious effort to educate themselves about the role technology can and should play in classroom pedagogy and pass that knowledge and those skills along to their teacher candidates to make technology integration a natural and accepted part of the teaching profession. With further research in this area, augmented support from schools and districts, and increased and continued efforts on the part of teacher educators, the quality of technology use in classrooms will improve.

# 5. SUMMARY AND CONCLUSIONS

Entering the teaching profession is challenging as novice teachers are confronted with the realities of the profession, which often conflict with their personal ideals and previous experiences as students. The abrupt clash between their expectations for themselves as teachers and the contexts within which they practice their craft can be challenging and even demoralizing. The first year of teaching is an overwhelming experience in itself, which is only compounded by expectations that they maintain well-managed classrooms, integrate state standards into their lessons, and differentiate their instruction for all students. First-year teachers are often placed in more difficult classrooms with less motivated and lower-achieving students (Darling-Hammond, 2010; Darling-Hammond, 2011), which can have a career-ending impact as self-efficacy changes with experience and perceived success or failure.

This dissertation focused on how novice teachers' self-efficacy and pedagogy changed across their first year in the profession. By examining survey and observation data, I was able to discern patterns in participants' levels of confidence as well as their teaching practices as their experience increased throughout the school year. The use of multiple classroom observation instruments made it possible to develop a multidimensional picture of the classroom environment, including teacher and student behaviors and interactions and technology availability and use, while the longitudinal surveys provided insight into the effects of time and experience on the teachers' beliefs in their own ability to be successful.

In the first study, *Changes in First-year Teachers' Self-Efficacy and Confidence in Teaching*, I used the first section of the TAMU Collaborative Cohort Survey to determine what changes, if any, occur for first-year teachers' self-efficacy. Through careful examination of the survey responses across four critical points in the participants' preservice education and first year in the field, I revealed a trend common to all four scales measured by the instrument: (a) creating an effective and inclusive learning environment, (b) differentiating instruction for all students, (c) respecting familial and cultural differences, and (d) integrating tools and strategies for teaching and learning. I found that over the course of the summer methods courses preceding the first year in the classroom, candidates' self-efficacy significantly increases for each scale. However, once they enter the classroom and persevere through the first semester, that confidence lapses in all four areas with the initial shock and challenge of being a full-responsibility teacher. As teaching experience increases and by the end of the second semester, the confidence again significantly increases, further illustrating how volatile novice teachers' self-efficacy for teaching responsibilities is. That all four scales followed a similar pattern, indicating a general trend in first-year teachers' self-efficacy, is of particular interest. This highlights how easily affected new teachers' confidence is and underscores the importance of nurturing that confidence while raising the candidates' awareness of the realities and challenges of the profession throughout the course of their preparation. In doing so, teacher educators can help reduce teacher turnover due to early-career disillusionment while increasing their own accountability.

In the second study, *Classroom Instruction Differences Between First-Year Teaching Interns and Experienced Classroom Teachers,* a combination of three classroom observation protocols were used to explore the nature of the overall classroom environment as well as of teacher and student behaviors and interactions. I compared observational data from first-year teachers' classrooms with those from more experienced teachers' classrooms to explore the similarities and differences between the two groups.

In the first-year teachers' classrooms, the setting was predominantly whole-class, direct instruction. The teachers' interactions with the students were most often instructional with the purpose of explaining or cueing and prompting with relation to course content. The teachers used technology approximately 50% of the time and typically to present material. The students in these classrooms were observed interacting with each other more often than with their teachers and were most often listening or watching and working on written assignments. They were generally on-task and behaviorally engaged, but they used technology very little. The most commonly observed characteristic of the classroom environment was that transitions were quick and efficient.

A whole-group setting was also most commonly observed in the more experienced teachers' classrooms, but instruction was most often learner-centered and interactions with the students were predominantly instructional and included explanation and questioning with a focus on content. The teachers used technology less in these classrooms and most often as a communication tool. Again, the students interacted with

each other more often than with the teachers and were typically listening or watching and working on written assignments. They too were largely on-task and behaviorally engaged and while they used technology more than those in the first-year teachers' classrooms, it was still very little. The classroom environment included warm and supportive relationships and a sharing of intellectual control between the teachers and their students, common and even distribution of feedback, and opportunities for students to work out content.

When the groups were directly compared, the first-year teachers were observed significantly more frequently (a) interacting with students in a managerial way, and (b) using technology for the purpose of presenting material than teachers in the comparison group. On the other hand, teachers from the comparison group were observed (a) interacting with students in an instructional way, and (b) listening significantly more than the intern group. Students from the internship group classes were observed significantly more (a) working in an individualized setting, (b) not interacting, (c) reading, and (d) gathering information with technology. Conversely, students from comparison group classes were observed (a) in a small-group setting, (b) on-task, (c) behaviorally engaged, (d) interacting with the teacher in a managerial context, (e) discussing, (f) answering teacher-posed questions, (g) exploring/inquiring, (h) organizing, managing, and analyzing information, (i) communicating and displaying findings, and (j) using laptop computers significantly more than students from the effective schools. There was a significant difference between the two groups of

teachers' classrooms on the variable of challenged/questioned content, which was observed more often in the first-year teachers' classrooms.

My findings demonstrated that students' lack of interaction and solitary activities indicated that first-year teachers are more focused on classroom management through individualized settings and technology-based presentation of material. Conversely, the classrooms of more experienced teachers were more student-centered and involved a variety of activities and teaching strategies, rendering the students on-task and behaviorally engaged in collaborative learning with small groups. The disparities between the classroom environments and instructional practices of first-year and more experienced teachers indicate that as teachers progress through their careers, they increase their arsenal of teaching strategies as well as their understanding of how to select and implement diverse and appropriate strategies to foster deep and engaging learning. It is important to point out that the participants in this study teach in a wide variety of school contexts and teaching conditions, which do play a role in how teachers practice and perform. The diversity of schools and districts that novice teachers are sent into further reinforces the significance of high-quality preservice field experiences. These critical portions of teacher education contribute to the development of critical and effective teaching practices prior to entering the profession as a full-responsibility teacher helps to ensure that early-career educators are well-prepared for their careers while supporting teacher education program accountability measures.

In the third study, *Technology Integration into Classroom Instruction: Changes in First-Year Teachers' Self-Efficacy and Pedagogy*, I combined the observation and

survey methodologies for a more complete conceptualization of how technology was used in the novice teachers' classrooms. Taken together, the data collected from the T3 Overall Classroom Observation Measure and the third section of the TAMU Collaborative Cohort Survey provided a thorough and multifaceted representation of the participants' views and practices regarding classroom technology use.

The observation protocol allowed me to focus on the accessibility of technology in the teachers' classrooms as well as how that technology was used by both teachers and students and to what extent. Though technology availability varied widely between the observed classrooms, there were no significant differences in its general use between the Fall and Spring semesters. Most often, laptop and desktop computers were used in conjunction with projectors to display content for students to copy or take notes over. As such, the available technology was rarely used in a way that facilitated individualized exploration or inquiry. There were very few significant differences in the nature of the technology use from one semester to the next, including an increase in students' use of technology to access the internet, for assessment purposes, and to produce new knowledge. However, the quality of the overall use of technology significantly improved from between "low-level use" and "somewhat meaningful use" in the Fall to between "somewhat meaningful use" and "meaningful use" in the Spring semester, indicating increased familiarity and comfort with the technology and its role in the classroom.

The survey results revealed that after decreasing sharply and significantly over the course of the Summer methods courses and slightly further into the Fall semester,

self-efficacy for integrating technology to support teaching and learning began to slightly increase from the Fall to the Spring semesters. This slight yet insignificant improvement from the first to the second semester mirrors the minor changes in observed technology use across the same time period.

As first-year teachers focus on surviving their induction year, they may not see technology training, practice, and incorporation as primary concerns. Technology integration can be especially challenging for first-year teachers because of the many personal, contextual, and professional issues that play a role in when and how it is included in the pedagogical routine (Clausen, 2007). In addition, new teachers' self-efficacy for using technology to support teaching and learning tends to be extremely volatile as they attempt to reconcile what they believed they knew and were capable of with the reality of what materials, training, and time they have access to. This study illustrates teacher educators' obligation to combat candidates' conscious and unintentional resistance to experimentation with technology integration into their teaching practices. They should continue to develop their own expertise regarding technology's role in today's educational contexts and ensure that their students are well-prepared to dedicate the necessary time and effort to build a repertoire of knowledge and skills for supporting 21st Century teaching and learning.

The primary limitation of all three studies is the sample. The observation and survey data used for all three studies were collected for projects outside of my dissertation. Therefore, I employed secondary data analysis to address my research questions. This limited my sample sizes as well as my ability to collect additional data

from or follow up with the participants. In addition, all participants from the first and third studies and the group of first-year teachers from the second study are all students in the same teacher education program at the same university and therefore received identical education-based coursework and taught their first year in the same state. As such, the cohorts are notably homogenous: 82.1% female, 37.4% White, 2.3% Africa-American, 13.3% Hispanic/Latino, and 2.4% Asian. This demographic makeup is more homogenous than the state post-baccalaureate program population programs with regard to gender (77.1% female), and less homogenous than the state post-baccalaureate population with regard to ethnicity (70.9% White, 6.8% African-American, 16.4% Hispanic/Latino, and 3.8% Asian) (Texas Education Agency, 2014). Furthermore, the sample sizes for the second and third studies are small. These factors, in conjunction with convenience sampling, make the generalizability of the findings limited in scope.

There are some concerns traditionally associated with observation and self-report survey research. There is no guarantee that either one will capture authentic data devoid of outside influence, bringing about concerns regarding the reliability of the data. To address these issues, I calculated inter-rater reliability for each observation protocol as well as Cronbach's alpha for each survey scale. These analyses demonstrated that the instruments produced reliable results for each of the three studies

Though all of the participants were from the same teacher education program and the sample sizes were small in the second and third studies, when taken together, these studies have important implications for the teacher education field. Not only should teacher preparation programs provide candidates with the knowledge and skills they

need to be effective teachers, but also, they could foster high self-efficacy, leading to greater resilience and dedication to the teaching field. They need to take steps to build and support candidates' self-efficacy through practical and meaningful field experiences, and through raising their awareness of the challenges and realities that come with teaching. They should work to maximize skill readiness and emotional preparedness for all teacher candidates. To do so, programs should examine how classroom learning and field experiences combine to nurture the development of preservice and novice teachers. Coursework and field experiences should provide opportunities for application of content knowledge, exploration of instructional methodologies, and examination of pedagogical theories in authentic, naturalistic settings prior to entering the classroom as a full-responsibility teacher. Through this process, candidates should receive scaffolded opportunities and constructive feedback on their performance as they develop the skills they need to facilitate quality learning in well-constructed classroom environments. Classroom observation is a clear way to deliver that essential feedback at the critical points of their development.

Improving teaching practice as well as teacher evaluation methods has become a major national focus. This push has resulted in many state-level changes in school- and district-based teacher ratings systems, including 44 states' and the District of Columbia's requirement that classroom observations be incorporated into teacher evaluations (Doherty & Jacobs, 2013) and 32 states' and the District of Columbia's inclusion of multiple methods for assessing teacher effectiveness (Steinberg & Sartain, 2015). As accountability measures for inservice teachers and their employers evolve and become

more authentic and rigorous, so should those for preservice teachers. The use of multiple detailed classroom observation protocols in conjunction with frequent self-efficacy surveys throughout the required teacher education coursework and field experiences will allow programs to more completely prepare future teachers for the standards and realities of K-12 education. In addition, the data collected by these multiple measures will provide programs with regular and multi-dimensional feedback regarding the quality of that preparation and highlighting any gaps in emotional and pedagogical development that need to be further addressed.

Future research in the area should strive to further illuminate the relationship between teacher education, self-efficacy, teacher effectiveness, and student learning and academic success. This dissertation is an early step toward determining ways for teacher educators to more concretely examine the link between self-efficacy, instructional practice, and teacher effectiveness and career longevity. Perhaps by developing methods for correlating findings from the observation and self-efficacy survey protocols with student achievement data, the connections between these important variables will become more concrete and readily able to be evaluated. The findings of these types of analyses will inform teacher education programs as they make decisions regarding their structure and foci as well as meet the demands for providing evidence of effectiveness and accountability (Zeichner, 2002).

My research can be extended by collecting data from a wide variety of teacher preparation programs and using random sampling to explore the extent to which my findings can be generalized. A popular sentiment among classroom teachers is that the

first year is a time for survival, the second year is a time for reflection and experimentation, and the third year is when a teacher really comes into his/her own. To explore the validity of this statement, further data could be collected across the second and third years of teaching to track further changes in self-efficacy and pedagogy. By continuing on with this line of research, it is possible to explore and further understand the nature of preparing new teachers to be effective in their chosen careers as they build their collection of teaching strategies for creating an effective and inclusive learning environment, differentiating instruction for all students, respecting cultural and familial differences, integrating tools for teaching and learning, and using technology to support teaching and learning.

# REFERENCES


AACTE Committee on Innovation and Technology. (2008*). Handbook of technological pedagogical content knowledge (TPCK) for educators*. New York, NY: Routledge.

Adam, R. D. (1982). Teacher development: A look at changes in teacher perceptions and behavior across time. *Journal of Teacher Education, 33*(4), 40-43.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-215

National Commission on Teaching and America's Future. (2007). *The cost of teacher turnover in five school districts: A pilot study.* Arlington, VA: Barnes, G., Crowe, E., & Schaefer, B.

Berry, B., Montgomery, D., & Snyder, J. (2008). *Urban teacher residency models and institutes of higher education: Implications for teacher preparation.* Center for Teaching Quality., Chapel Hill, NC.

Boyd, D. J., Grossman, P. L., Lankford, H., Loeb, S., & Wyckoff, J. (2009). Teacher preparation and student achievement. *Educational Evaluation and Policy Analysis, 31*(4), 416-440.

Brown, D. B., Rollins, K. B., Alford, B. L., Waxman, H. C., & Stillisano, J. R. (2012). Integrating college and career readiness standards in a post-baccalaureate teacher preparation program. *The Texas Forum of Teacher Education, 2,* 13-28.

Campbell, C., & Martin, D. (2010). Interactive whiteboards and the first year experience: Integrating IWBs into preservice teacher education. *Australian Journal of Teacher Education, 35*(6), 68-75.

Capraro, R. M., Capraro, M. M., Capraro, R. M., & Helfeldt, J. (2010). Do differing types of field experiences make a difference in teacher candidates' perceived level of competence? *Teacher Education Quarterly, 37*(1), 131-154.

Clausen, J. M. (2007). Beginning teachers' technology use: First-year teacher development and instructional context's effect on new teachers' instructional technology use with students. *Journal of Research on Technology in Education, 39*(3), 245-261.

Cockburn, J. (2005). Perspectives and politics of classroom observation. *Research in Post-Compulsory Education, 10*(3), 383-388.

Collins, A. & Halverson, R. (2009). *Rethinking education in the age of technology: The digital revolution and the schools*. New York: Teachers College Press.

Conklin, A. M., Dahling, J. J., & Garcia, P. A. (2012). Linking affective commitment, career self-efficacy, and outcome expectations: A test of Social Cognitive Career Theory. *Journal of Career Development, 40*(1), 68-83.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.

Cuban, L., Kirkpatrick, H., & Peck, C., (2001). High access and low use of technologies in high school classrooms: Explaining an apparent paradox. *American Educational Research Journal, 38*(4), 813-834.

Daniels, L. M., Mandzuck, D., Perry, R. P., & Moore, C. (2011). The effects of teacher candidate's perceptions of their initial teacher education program on teaching anxiety, efficacy, and commitment. *Alberta Journal of Educational Research, 57*(1), 88-106.

Darling-Hammond, L. (2003). Keeping Good Teachers: Why It Matters, What Leaders Can Do. *Educational leadership, 60*(8), 6-13.

Darling-Hammond, L. (2006). *Powerful teacher education: Lessons from exemplary programs.* San Francisco: Jossey-Bass.

Darling-Hammond, L. (2010). The flat world and education: How America's commitment to equity will determine our nation's future. New York: Teachers College Press.

Darling-Hammond, L. (2011). Effective teaching as a civil right: How building instructional capacity can help close the achievement gap. *Voices in Urban Education*, 31, 44-58.

Darling-Hammond, L., Chung, R., & Frelow, F. (2002). Variation in teacher preparation: How well do different pathways prepare teachers to teach? *Journal of Teacher Education, 53*, 286-302. doi: 10.1177/0022487102053004002

Day, C., & Guo, Q. (2010). *The new lives of teachers: Teacher quality and school development*. Abingdon, UK: Routledge.

Day, C., Kington, A., Stobart, G., & Sammons, P. (2006). The personal and professional selves of teachers: stable and unstable identities. *British Educational Research Journal, 32*(4), 601-616.

Doherty, K.M., & Jacobs, S., (2013). *State of the states 2013: Connect the dots: Using evaluations of teacher effectiveness to inform policy and practice*. Center for Teaching Quality.

Ertmer, P. A. (2005). Teacher pedagogical beliefs: The final frontier in our quest for technology integration? *Educational Technology Research & Development, 53*(4), 25-39.

Feiman-Nemser, S. (2003). What new teachers need to learn. *Educational Leadership, 60*(8), 25-29.

Flores, M. A., & Day C. (2006). Contexts which shape and reshape new teachers' identities: A multi-perspective study. *Teaching and Teacher Education, 22,* 219-232.

Fox, A. G., & Peters, M. L. (2013). First year teachers: Certification program and assigned subject on their self-efficacy. *Current Issues in Education, 16*(1), 1-14.

Fuller, F. F. (1969). Concerns of teachers: A developmental conceptualization. *American educational research journal*, 207-226.

Greenberg, J., Pomerance, L., & Walsh, K. (2011). *Student teaching in the United States.* Washington D.C.: National Council on Teacher Quality.

Guo, Y., Connor, C. M., Yang, Y., Roehrig, A. D., & Morrison, F. J. (2012). The effects of teacher qualification, teacher self-efficacy, and classroom practices on fifth graders' literacy outcomes. *The Elementary School Journal, 113*(1), 3-24.

Guss, S. S., Norris, D. J., Horm, D. M., Monroe, L. A., & Wolfe, V. (2012). Lessons learned about data utilization from classroom observations. *Early Education & Development, 24*(1), 4-18.

Hamre, B. K., Pianta, R. C., Downer, J. T., DeCoster, J., Mashburn, A. J., Jones, S. M., Brown, J. L., Cappella, E., Atkins, M., Rivers, S. E., Brackett, M. A., & Hamagami, A. (2013). Teaching through interactions: Testing a developmental framework of teacher effectiveness in over 4,000 classrooms. *The Elementary School Journal, 113*(4), 461-487.

Hargreaves, A., & Fullan, M. (2012). *Professional capital: Transforming teaching in every school*. New York: Teachers College Press.

Hilberg, R. S., Waxman, H. C., & Tharp, R. G. (2004). Purposes and perspectives on classroom observation research. In H. C. Waxman, R. G. Tharp & R. S. Hilberg (Eds.), *Observational research in U.S. classrooms: New approaches for understanding cultural and linguistic diversity* (1-20). Cambridge, United Kingdom: Cambridge University Press.

Hill, H. C., & Grossman, P. (2013). Learning from teacher observations: Challenges and opportunities posed by new teacher evaluation systems. *Harvard Educational Review, 83*(2), 371-401.

Hoigaard, R., Giske, R., & Sundsli, K. (2012). Newly qualified teachers' work engagement and teacher efficacy influences on job satisfaction, burnout, and the intention to quit. *European Journal of Teacher Education*, *35*(3), 347-357. doi: 10.1080/02619768.2011.633993

Inan, F. A., Lowther, D. L., Ross, S. M., & Strahl, D. (2010). Pattern of classroom activities during students' use of computers: Relations between instructional strategies and computer applications. *Teaching and Teacher Education, 26*(3), 540-546.

Ingersoll, R. M., & Smith, T. M. (2004). Do teacher induction and mentoring matter? *National Association of Secondary School Principals Bulletin, 88*(638), 28-40.

Kane, T. J., & Staiger, D. O., (2012). Gathering feedback for teaching: Combining high-quality observations with student surveys and achievement gains. Seattle, WA: Bill & Melinda Gates Foundation.

Kane, T. J., Taylor, E. S., Tyler, J. H., & Wooten, A.L. (2011). Evaluating teacher Effectiveness: Can classroom observations identify practices that raise achievement? Education Next, *11*(3), 54-60.

Klassen, R. M., & Chiu, M. M. (2010). Effects of teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology, 102*(3), 741-756. doi: 10.1037/a0019237

Klassen, R. M., & Chiu, M. M. (2011). The occupational commitment and intention to quit of practicing and preservice teachers: Influence of self-efficacy, job stress, and teaching context. *Contemporary Educational Psychology*, *36*, 114-129. doi: 10.1016/j.cedpsych.2011.01.002

Learning, T. B. (2010). *Transforming teacher education through clinical practice: A national strategy to prepare effective teachers.* Washington D.C.: National Council for the Accreditation of Teacher Education.

Lee, Y-H., Waxman, H. C., Wu, J-Y., Michko, G., & Lin, G. (2013). Revisit the effect of teaching and learning with technology. *Educational Technology & Society, 16*(1), 133-146.

Lei, J. & Zhao, Y. (2007). Technology uses and student achievement: A longitudinal study. *Computers & Education, 49*(2), 284-296.

Lent, R. W., & Brown, S. D. (2006). On conceptualizing and assessing social cognitive constructs in career research: A measurement guide. *Journal of Career Assessment, 14*(12), 12-35. doi: 10.1177/1069072705281364

Loeb, S., Darling-Hammond, L., & Luczak, J. (2005). How teaching conditions predict teacher turnover in California schools. *Peabody Journal of Education, 80*(3), 44-70.

Lowther, D. L., Ross, S. M., & Morrison, G. M. (2003). When each one has one: The influences on teaching strategies and student achievement of suing laptops in the classroom. *Educational Technology Research & Development, 51*(3), 23-44.

Ma, W. K., Andersson, R., & Streith, K-O. (2005). Examining user acceptance of computer technology: An empirical study of student teachers. *Journal of Computer Assisted Learning, 21*(6), 387-395.

Malmberg, L., Hagger, H., Burn, K., Mutton, T., & Colls, H. (2010). Observed classroom quality during teacher education and two years of professional practice. *Journal of Educational Psychology, 102*(4), 916-932.

McKinney, S. E., Chappell, S., Berry, R. Q., & Hickman, B. T. (2009). An examination of the instructional practices of mathematics teachers in urban schools. *Preventing School Failure, 53*, 278-284.

Mueller, C. M. (2012). *The impact of teacher certification programs on teacher efficacy, job satisfaction, and teacher performance: A comparison of traditional and alternative certification*. (Unpublished doctoral dissertation). Western Kentucky University, Bowling Green, KY.

Newman, K. (2009). Teacher training, tailor-made. *Education Next, 9*(2), 42-49.

Nickerson, R. S., & Zodhiates, P. P. (Eds.). (2013). *Technology in education: Looking toward 2020*. Routledge.

O'Brien, A. (2010). A clinical approach to teacher preparation: A conversation with teacher educator Elizabeth Bondy. *Learning First Alliance*. Alexandria, VA.

O'Leary, M. (2012). Exploring the role of lesson observation in the English education system: A review of methods, models, and meanings. *Professional Development in Education, 38*(5), 791-810.

Ottenbreit-Leftwich, A. T., Brush, T. A., Strycker, J., Gronseth, S., Roman, T., Abaci, S., vanLeusen, P., Shin, S., Easterling, W., & Plucker, J. (2012). Preparation versus practice: How do teacher education programs and practicing teachers align in their use of technology to support teaching and learning?. *Computers & Education, 59*(2), 399-411.

Ottenbreit-Leftwich, A.T., Glazewski, K., Newby, T., & Ertmer, P. (2010). Teacher value beliefs associated with using technology: addressing professional and student needs. *Computers & Education, 55*(3), 1321-1335.

Padrón, Y. N., Waxman, H. C., Lee, Y-H., Lin, M-F., & Michko, G. M. (2012). Classroom observations of teaching and learning with technology in urban elementary school mathematics classrooms serving English language learners. *International Journal of Instructional Media, 39(1), 45-54.*

Papay, J. P., West, M. R., Fullerton, J. B., & Kane, T. J. (2012). Does an urban teacher residency increase student achievement? Early evidence from Boston. *Educational Evaluation and Policy Analysis, 34*(4), 413-434.

Pianta, R.C., la Paro K. M., Payne, C., Cox, M. J., & Bradley, R. (2002). The relation of kindergarten classroom environment to teacher, family, and school characteristics and child outcomes. *The Elementary School Journal, 102*(3), 225-238.

Pickering, L. E., & Walsh, E. J. (2011). Using videoconferencing technology to enhance classroom observation methodology for the instruction of preservice early childhood professionals. *Journal of Digital Learning in Teacher Education, 27*(3), 99-108.

Puentedura, R.R. (2013). *SAMR: Getting to transformation*. Retrieved from http://www.hippasus.com/rrpweblog/archives/2013/04/16/SAMRGettingToTransformation.pdf

Raphael, L. M., Pressley, M., & Hohan, L. (2008). Engaging instruction in middle school classrooms: An observational study of nine teachers. *The Elementary School Journal, 109*(1), 61-81.

Roberson, T. J. (1998, November). *Classroom observation: Issues regarding validity and reliability*. Paper presented at the annual meeting of the Mid-South Educational Research Association.

Ross, S. M., & Smith L. J. (1996). *Classroom observation measure observer's manual*. Memphis, TN: University of Memphis, Center for Research in Educational Policy.

Ross, S. M., Smith, L. J., Alberg, M., & Lowther, D. (2004). Using classroom observation as a research and formative evaluation tool in educational reform: The school observation measure. In H. C. Waxman, R. G. Tharp & R. S. Hilberg (Eds.), *Observational research in U.S. classrooms: New approaches for understanding cultural and linguistic diversity* (144-173). Cambridge, United Kingdom: Cambridge University Press.

Russell, M., Bebell, D., O'Dwyer, L., & O'Connor, K. (2003). Examining teacher technology use: Implications for preservice and inservice teacher preparation. *Journal of Teacher Education, 54*(4), 297-310.

Sartain, L., Stoelinga, S. R., Brown, E. R., Luppescu, S., Matsko, K. K., Miller, F. K., Durwood, C. E., Jiang, J. Y., & Glazer, D. (2011). *Rethinking teacher evaluation in Chicago: Lessons learned from classroom observations, principal-teacher conferences, and district implementation.* Chicago: The University of Chicago Urban Education Institute, Consortium on Chicago School Research.

Schwartz, R., Hernandez, M., & Ngo, J. (2010). Attracting and retaining strong teachers. In R. E. Curtis & J. Wurtzel (Eds.), *Teaching talent: A visionary framework for human capital in education* (pp. 113-128). Cambridge, MA: Harvard Education Press.

Smeaton, P. S., & Waters, F. H. (2013). What happens when first year teachers close their classroom doors? An investigation into the instructional practices of beginning teachers. *American Secondary Education 41*(2), 71-93.

Snyder, C. (2012). Finding the "royal road" to learning to teach: Listening to novice teacher voices in order to improve the effectiveness of teacher education. *Teacher Education Quarterly, 39*(4), 33-53.

Starks, D., Nicholas, H., & Macdonald, D. (2012). Structured reflective communication as a meta-genre in teacher education: creative uses of 'critique' in a teacher education program. *Australian Journal of Teacher Education, 37*(3), 90-110.

Steinberg, M. P., & Sartain, L. (2015). Does better observation make better teachers? *Education Next, 15*(1).

Stuhlman, M. W., & Pianta, R. C. (2009). Profiles of educational quality in first grade. *The Elementary School Journal, 109*(4), 323-342.

Taylor, E. S., & Tyler, J. H. (2012). Can teacher evaluation improve teaching?: Evidence of systematic growth in the effectiveness of midcareer teachers. *Education Next, 12*(4).

Teacher attrition costs United States up to $2.2 billion annually, says New Alliance report (2014, July 17). Retrieved from http://all4ed.org/press/teacher-attrition-costs-united-states-up-to-2-2-billion-annually-says-new-alliance-report/.

Teo, T. (2010). Explaining the intention to use technology among volitional users in education: An evaluation of the technology acceptance model (TAM) using structural equation modeling. *International Journal of Instructional Media, 37*(4), 379-389.

Texas Education Agency. (2014). *Certified teacher demographics by preparation route 2008-2012* (Data file).

The New Teacher Project. (2013). Fixing classroom observations: How common core will change the way we look at teaching. New York: author.

Tschannen-Moran, M., & Johnson, D. (2011). Exploring literacy teachers' self-efficacy beliefs: Potential sources at play. *Teaching and Teacher Education, 27,* 751-761.

Tschannen-Moran, M., & Hoy, A. W. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17,* 783-805.

Tschannen-Moran, M., & Hoy, A. W. (2007). The differential antecedents of self-efficacy beliefs of novice and experienced teachers. *Teaching and teacher Education, 23*(6), 944-956.

U.S. Department of Education (1996). *Goals 2000: Educate America Act, October 1996 Update.* Accessed June 1, 2014, from http://www2.ed.gov/pubs/ServPrivate/part4.html#Goals 2000.

U.S. Department of Education (2001). *No Child Left Behind Act of 2001.* Accessed June 1, 2014, from, http://www2.ed.gov/nclb/landing.jhtml.

U.S. Department of Education (2003). *Federal funding for educational technology and how it is used in the classroom: A summary of findings from the Integrated Studies of Educational Technology.* Office of the Under Secretary, Policy and Program Studies Service: Washington, D.C.

Vannatta, R. A., & Fordham, N. (2004). Teacher dispositions as predictors of classroom technology use. *Journal or Research on Technology in Education, 36*(3), 253-271.

Veenman, S. (1984). Perceived problems of beginning teachers. *Review of Educational Research, 54*(2), 143-178.

Vonk, J. H. C. (1989). Beginning teachers' professional development and its implications for teacher education and training. *The Irish Journal of Education, 23*(1), 5-21.

Von Zastrow, C. (2009). Breaking new ground in teacher education: A conversation with teacher educator Nancy Bacharach. *Learning First Alliance*. Alexandria, VA.

Waxman, H. C., Evans, R. T., Boriack, A. W. & Kilinc, E. (2013). Systematic observations of the availability and use of instructional technology in urban middle school classrooms. *Journal of Contemporary Research in Education. 1*(3), 104-113.

Waxman, H. C., Padrón, Y. N., Franco-Fuenmayor, S. E., & Huang, S. L. (2009). Observing classroom instruction for ells from student, teacher, and classroom perspectives. *The TABE Journal*, *11*(1), 63-95.

Waxman, H. C., Wang, M. C., Lindvall, C. M., & Anderson, K. A. (1988). *Classroom observation schedule technical manual* (Rev. Ed.). Philadelphia: Temple University, Center for Research in Human Development and Education.

Weber, N. D., Hodges, T. S., & Waxman, H. C. (2013). The development of an instrument to measure factors that impact preservice teachers' perceived field commitment in teacher preparation programs. *The Texas Forum of Teacher Education, 3*, 87-101.

Wessel, J. L., Ryan, A. M., & Oswald, F. L. (2008). The relationship between objective and perceived fit with academic major, adaptability, and major-related outcomes. *Journal of Vocational Psychology, 72*, 363-376.

Whitacre, M., & Pena, C. (2011). From the classroom to the field: Preservice teachers integration of technology during field placement. *International Journal of Instructional Media, 38*(3), 237-244.

Xiong, W. (2013). A potential approach to preservice teachers' professional learning: The video analysis of the authentic classroom. *US-China Education Review, 33*(3), 149-161.

# APPENDIX A: TAMU COLLABORATIVE COHORT SURVEY

**PART I: Student Information**

1. Sex: ○ male ○ female

2. Which best describes your ethnicity?
   ○ American Indian/Alaskan Native ○ Asian/Pacific Islander ○ Latino(a)
   ○ African-American ○ White, not of Hispanic descent
   ○ Other (please specify)_____

3. Which of the following certifications do you have? (Mark all that apply)
   ○Mathematics (8-12) ○Science Composite (8-12) ○ Physical Science (8-12)
   ○Life Science (8-12) ○Chemistry (8-12) ○ Reading/Lang. Arts (8-12)
   ○Foreign Language (8-12) ○History (8-12) ○ Social Studies Comp. (8-12)
   ○ Other (please specify)_____

**PART II: Using the scale, Not at all confident (NC), Somewhat confident (SC), Confident (C), or Extremely Confident (EC), please indicate your level of confidence in your abilities to do the following:**

| | | NC | SC | C | EC |
|---|---|---|---|---|---|
| 4. | Maintain effective classroom management | ○ | ○ | ○ | ○ |
| 5. | Create a lesson plan | ○ | ○ | ○ | ○ |
| 6. | Develop strategies for working with parents and families | ○ | ○ | ○ | ○ |
| 7. | Recognize and respect individual family differences | ○ | ○ | ○ | ○ |
| 8. | Maintain ongoing parent communication | ○ | ○ | ○ | ○ |
| 9. | Integrate multiple subject areas | ○ | ○ | ○ | ○ |
| 10. | Employ effective instructional strategies for students with special needs | ○ | ○ | ○ | ○ |
| 11. | Differentiate instruction for all students | ○ | ○ | ○ | ○ |
| 12. | Employ effective instructional strategies for students from a variety of cultural backgrounds | ○ | ○ | ○ | ○ |
| 13. | Employ effective instructional strategies for students from varying socioeconomic backgrounds | ○ | ○ | ○ | ○ |
| 14. | Employ effective instructional strategies for students who speak English as a second language | ○ | ○ | ○ | ○ |
| 15. | Create a learning environment that encourages students to appreciate cultural diversity | ○ | ○ | ○ | ○ |
| 16. | Integrate technology in the delivery of instructional content | ○ | ○ | ○ | ○ |
| 17. | Create an authentic learning environment via the use of real-life tools/ experiences | ○ | ○ | ○ | ○ |
| 18. | Your level of confidence in preparing high school students to be academically successful in college courses | ○ | ○ | ○ | ○ |

**PART III: Using the scale, Not at all aware (NA), Somewhat aware (SA), Aware (A), or Extremely Aware (EA), indicate your level of awareness of the following standards:**

| | NA | SA | A | EA |
|---|---|---|---|---|
| 19. Texas Essential Knowledge and Skills (TEKS) | ○ | ○ | ○ | ○ |
| 20. College and Career Readiness Standards (CCRS) | ○ | ○ | ○ | ○ |

**PART IV: For the following items, please indicate your:**

**level of confidence** (1 = not all confident, 2 = somewhat confident, 3 = confident, 4 = extremely confident) in your ability to execute each item.

| | Confidence | | | |
|---|---|---|---|---|
| | **1** | **2** | **3** | **4** |
| 21. Promote students' intellectual curiosity | ○ | ○ | ○ | ○ |
| 22. Promote students' reasoning | ○ | ○ | ○ | ○ |
| 23. Facilitate problem-solving | ○ | ○ | ○ | ○ |
| 24. Promote successful student academic behaviors | ○ | ○ | ○ | ○ |
| 25. Foster effective student work habits | ○ | ○ | ○ | ○ |
| 26. Promote students' academic integrity | ○ | ○ | ○ | ○ |
| 27. Teach reading across the curriculum | ○ | ○ | ○ | ○ |
| 28. Teach writing across the curriculum | ○ | ○ | ○ | ○ |
| 29. Teach research across the curriculum | ○ | ○ | ○ | ○ |
| 30. Teach the use of data | ○ | ○ | ○ | ○ |
| 31. Teach the use of technology | ○ | ○ | ○ | ○ |

**PART V: Using the scale, Not at all confident (NC), Somewhat confident (SC), Confident (C), or Extremely Confident (EC), please indicate your level of confidence in your abilities to use technology to do the following:**

| | Rate of Use | | | |
|---|---|---|---|---|
| | **NC** | **SC** | **C** | **EC** |
| 32. Use email | ○ | ○ | ○ | ○ |
| 33. Access Facebook | ○ | ○ | ○ | ○ |
| 34. Access Twitter | ○ | ○ | ○ | ○ |
| 35. Create/maintain a blog | ○ | ○ | ○ | ○ |
| 36. Create a presentation (e.g., PowerPoint) | ○ | ○ | ○ | ○ |
| 37. Create video (e.g., iMovie) | ○ | ○ | ○ | ○ |
| 38. Maintain a calendar | ○ | ○ | ○ | ○ |
| 39. Listen to music | ○ | ○ | ○ | ○ |
| 40. View podcast | ○ | ○ | ○ | ○ |

| | | | | |
|---|---|---|---|---|
| 41. Read ebooks | ○ | ○ | ○ | ○ |
| 42. Social bookmarking/tagging (e.g., Pinterest) | ○ | ○ | ○ | ○ |
| 43. Video communication (e.g., Skype) | ○ | ○ | ○ | ○ |
| 44. Web browsing | ○ | ○ | ○ | ○ |
| 45. Watch video | ○ | ○ | ○ | ○ |
| 46. Lesson planning | ○ | ○ | ○ | ○ |
| 47. Find resources for classroom lessons (e.g., video, simulations) | ○ | ○ | ○ | ○ |
| 48. Collaborate with other teachers | ○ | ○ | ○ | ○ |
| 49. Communicate with other students in the program | ○ | ○ | ○ | ○ |
| 50. Create a class video with the entire class | ○ | ○ | ○ | ○ |
| 51. Use the Maps App for instant field trips | ○ | ○ | ○ | ○ |
| 52. Play audio books for the entire class | ○ | ○ | ○ | ○ |
| 53. Download free books to share in small group sessions | ○ | ○ | ○ | ○ |
| 54. Use the camera to take pictures and create a writing assignment using the pictures | ○ | ○ | ○ | ○ |
| 55. Connect an iPad to a projector for whole group learning using various educational apps | ○ | ○ | ○ | ○ |
| 56. Connect an iPad to a projector to stream videos for the whole class | ○ | ○ | ○ | ○ |
| 57. Connect an iPad to a projector to share student presentations | ○ | ○ | ○ | ○ |
| 58. Use with an individual student who needs extra practice | ○ | ○ | ○ | ○ |
| 59. Use content specific apps for classroom lessons | ○ | ○ | ○ | ○ |
| 60. Use teacher apps to track student behavior | ○ | ○ | ○ | ○ |
| 61. Use as remediation for high/low students | ○ | ○ | ○ | ○ |
| 62. Practice test questions for an upcoming exam | ○ | ○ | ○ | ○ |
| 63. Play a trivia game with the entire class | ○ | ○ | ○ | ○ |
| 64. Show classroom photos during an Open House | ○ | ○ | ○ | ○ |
| 65. FaceTime with a another classroom | ○ | ○ | ○ | ○ |
| 66. FaceTime with an expert in the field | ○ | ○ | ○ | ○ |
| 67. Use the calendar to add classroom events and display on the projector each day | ○ | ○ | ○ | ○ |
| 68. Audio/video record lectures for students to reference | ○ | ○ | ○ | ○ |
| 69. Assist in managing IEP requirements for special education students | ○ | ○ | ○ | ○ |
| 70. Create mind maps with entire class | ○ | ○ | ○ | ○ |
| 71. Use iPad for assessing student learning | ○ | ○ | ○ | ○ |

**PART VI: Please answer the following questions.**

72. What are your biggest concerns regarding integrating technology into your classroom?

73. Overall, do you feel more prepared to enter the classroom after this summer's classes? Please describe why or why not.

74. Please describe specific aspects of the summer classes you found to be most valuable.

# APPENDIX B: TEACHER OBSERVATION INSTRUMENT

| (30 second time intervals) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **INTERACTIONS** (check one) | | | | | | | | | | | |
| 1. No interaction | | | | | | | | | | | |
| 2. With student(s) (instructional) | | | | | | | | | | | |
| 3. With student(s) (managerial) | | | | | | | | | | | |
| 4. With student(s) (social, personal) | | | | | | | | | | | |
| 5. With student(s) (collaborative) | | | | | | | | | | | |
| 6. Other: | | | | | | | | | | | |
| **SETTING** (check one) | | | | | | | | | | | |
| 1. Whole class | | | | | | | | | | | |
| 2. Small group (more than 2 students) | | | | | | | | | | | |
| 3. Dyads (2 students) | | | | | | | | | | | |
| 4. Individual | | | | | | | | | | | |
| 5. Traveling | | | | | | | | | | | |
| 6. Other: | | | | | | | | | | | |
| **INSTRUCTIONAL ORIENTATION** (check one) | | | | | | | | | | | |
| 1. Direct instruction (e.g., lecture) | | | | | | | | | | | |
| 2. Seatwork (e.g., worksheets, textbooks) | | | | | | | | | | | |
| 3. Learner-centered (e.g., cooperative learning, project-based, inquiry) | | | | | | | | | | | |
| 4. Other**:** | | | | | | | | | | | |
| **NATURE OF INTERACTION** (check all that are observed) | | | | | | | | | | | |
| 1. Questioning | | | | | | | | | | | |
| 2. Explaining | | | | | | | | | | | |
| 3. Positive commenting (e.g., “you look nice today”) | | | | | | | | | | | |
| 4. Negative commenting (e.g., “traffic was terrible this morning”) | | | | | | | | | | | |
| 5. Neutral commenting (e.g., general discussion about sports) | | | | | | | | | | | |
| 6. Listening | | | | | | | | | | | |
| 7. Cueing or prompting (scaffolding) | | | | | | | | | | | |
| 8. Modeling/demonstrating | | | | | | | | | | | |
| 9. Other**:** | | | | | | | | | | | |

| **PURPOSE OF INTERACTION** (check all that are observed) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Focus on content (e.g., subject area content) | | | | | | | | | | | |
| 2. Focus on process (e.g., learning strategies) | | | | | | | | | | | |
| 3. Focus on work product | | | | | | | | | | | |
| 4. Connect content to other disciplines | | | | | | | | | | | |
| 5. Connect content to real life issues | | | | | | | | | | | |
| 6. Redirect student thinking | | | | | | | | | | | |
| 7. Show interest in student work | | | | | | | | | | | |
| 8. Show personal regard for student | | | | | | | | | | | |
| 9. Encourage students to help each other | | | | | | | | | | | |
| 10. Encourage students to succeed | | | | | | | | | | | |
| 11. Encourage students to question | | | | | | | | | | | |
| 12. Encourage extended student responses | | | | | | | | | | | |
| 13. Encourage student self-management | | | | | | | | | | | |
| 14. Praise student behavior | | | | | | | | | | | |
| 15. Praise student performance | | | | | | | | | | | |
| 16. Correct student behavior | | | | | | | | | | | |
| 17. Correct student performance | | | | | | | | | | | |
| 18. Assess prior knowledge | | | | | | | | | | | |
| 19. Assess new knowledge | | | | | | | | | | | |
| 20. Other**:** | | | | | | | | | | | |
| **INSTRUCTIONAL TECHNOLOGY** (check all that are observed) | | | | | | | | | | | |
| 1. Use technology to present material | | | | | | | | | | | |
| 2. Assist students with technology | | | | | | | | | | | |
| 3. Use technology as a communication tool | | | | | | | | | | | |
| 4. Use technology to create | | | | | | | | | | | |
| 5. Use technology to access the Internet | | | | | | | | | | | |

# APPENDIX C: STUDENT OBSERVATION INSTRUMENT

| (30 second time intervals) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **SETTING** (check one) | | | | | | | | | | | |
| 1. Whole class | | | | | | | | | | | |
| 2. Small group (more than 2 students) | | | | | | | | | | | |
| 3. Dyad (2 students) | | | | | | | | | | | |
| 4. Individual | | | | | | | | | | | |
| 5. Other: | | | | | | | | | | | |
| **MANNER** (check one) | | | | | | | | | | | |
| 1. On-task | | | | | | | | | | | |
| 2. Off-task | | | | | | | | | | | |
| **TYPES OF ENGAGEMENT** (check all that are observed) | | | | | | | | | | | |
| 1. Behavioral (active response) | | | | | | | | | | | |
| 2. Cognitive (expending mental effort) | | | | | | | | | | | |
| 3. Affective (emotional reaction) | | | | | | | | | | | |
| **INTERACTION** (check one) | | | | | | | | | | | |
| 1. No interaction | | | | | | | | | | | |
| 2. With teacher – instructional | | | | | | | | | | | |
| 3. With teacher – managerial/social | | | | | | | | | | | |
| 4. With other students | | | | | | | | | | | |
| 5. Other**:** | | | | | | | | | | | |
| **ACTIVITY TYPES** (check all that are observed) | | | | | | | | | | | |
| 1. Written assignment | | | | | | | | | | | |
| 2. Assessment | | | | | | | | | | | |
| 3. Discussing | | | | | | | | | | | |
| 4. Reading | | | | | | | | | | | |
| 5. Tutoring | | | | | | | | | | | |
| 6. Working kinesthetically | | | | | | | | | | | |
| 7. Answering teacher-posed questions | | | | | | | | | | | |
| 8. Answering peer-posed questions | | | | | | | | | | | |
| 9. Questioning | | | | | | | | | | | |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 10. Presenting | | | | | | | | | | | |
| 11. Exploration/inquiry | | | | | | | | | | | |
| 12. Using concrete learning materials | | | | | | | | | | | |
| 13. Listening/watching | | | | | | | | | | | |
| 14. Distracted | | | | | | | | | | | |
| 15. Acting-out (behavior) | | | | | | | | | | | |
| 16. No activity/transition | | | | | | | | | | | |
| 17. Other**:** | | | | | | | | | | | |
| **EDUCATIONAL USE OF TECHNOLOGY** (check one) | | | | | | | | | | | |
| 1. Basic skills/drill/practice | | | | | | | | | | | |
| 2. Gather information | | | | | | | | | | | |
| 3. Organizing, managing, or analyzing information | | | | | | | | | | | |
| 4. Communicating and displaying findings | | | | | | | | | | | |
| 5. Word Processing | | | | | | | | | | | |
| 6. Other**:** | | | | | | | | | | | |
| **TECHNOLOGY** (check all that are observed) | | | | | | | | | | | |
| 1. Interactive whiteboard (e.g., SMART Board, Promethean Board) | | | | | | | | | | | |
| 2. Laptop computer | | | | | | | | | | | |
| 3. Desktop computer | | | | | | | | | | | |
| 4. Other: | | | | | | | | | | | |
| 5. Other: | | | | | | | | | | | |

# APPENDIX D: OVERALL CLASSROOM OBSERVATION INSTRUMENT

**Rating Scale**

| 1 | 2 | 3 |
|---|---|---|
| Not observed at all | Some extent (once or twice) | Great extent (3 or more times) |

| | 1 | 2 | 3 |
|---|---|---|---|
| **INSTRUCTION** | | | |
| 1. Teacher shared intellectual control with students. | | | |
| 2. Teacher created occasions when students could work out part (or all) of the content or instruc | | | |
| 3. Teacher provided opportunities for choice and independent decision-making. | | | |
| 4. Teacher provided a diverse range of ways of experiencing success. | | | |
| 5. Teacher promoted talk that was exploratory, tentative, and hypothetical. | | | |
| 6. Teacher encouraged students to learn from other students' questions and comments. | | | |
| 7. Teacher built a classroom environment that supported risk-taking. | | | |
| 8. Teacher used a wide variety of intellectually challenging teaching procedures. | | | |
| 9. Teacher used teaching procedures that were designed to promote specific aspects of quality learning. | | | |
| 10. Teacher developed students' awareness of the big picture (e.g., how the various activities fit together and linked to big ideas). | | | |
| 11. Teacher regularly raised students' awareness of the nature of different aspects of quality learning. | | | |
| 12. Teacher promoted assessment as part of the learning process. | | | |
| 13. Teacher actively facilitated students' engagement in activities and lessons to encourage partic | | | |
| 14. Teacher linked concepts and activities to one another. | | | |
| 15. Teacher applied new concepts to similar situations (elaborated). | | | |
| 16. Teacher acted as coach/facilitator. | | | |
| 17. Teacher provided students opportunities for problem solving. | | | |
| 18. Teacher asked open-ended questions. | | | |
| 19. Teacher provided feedback (answers, information, etc.). | | | |
| 20. Teacher provided ample wait-time for student responses. | | | |
| 21. Teacher integrated technology into the lesson. | | | |

| | | | |
|---|---|---|---|
| 22. Teacher distributed feedback evenly. | | | |
| 23. Teacher scaffolded/redirected student thinking. | | | |
| 24. Teacher related concepts to real world problems/solutions. | | | |
| 25. Teacher used a variety of modalities, including auditory, visual, and movement. | | | |
| 26. Teacher varied instructional styles (e.g., conversation, participation) include students' cultural preferences. | | | |
| 27. Teacher offered encouragement of students' efforts that increased students' involvement. | | | |
| 28. Teacher appeared to have warm, supportive relationships with students. | | | |
| 29. Teacher linked students' prior knowledge to the current lesson. | | | |
| **STUDENT** | | | |
| 1. Students had to the opportunity to offer and defend their prior views. | | | |
| 2. Students took responsibility/ownership of practical work. | | | |
| 3. Students challenged/questioned content (e.g., what the teacher said and/or information found text). | | | |
| 4. Students asked questions that indicated reflection on content or on their understandings and/ experiences. | | | |
| 5. Students connected ideas and concepts. | | | |
| 6. Students used different ways to answer (i.e., alternative solutions). | | | |
| 7. Students used technology to enhance problem solving/creativity. | | | |
| 8. Students used technology to learn basic skills (e.g., tutorials, drill & practice). | | | |
| 9. Students used technology to access the Internet. | | | |
| 10. Students were engaged in classroom activities. | | | |
| 11. Student activities were learner-centered. | | | |
| 12. Students solved problems using real-life objects in the classroom environment. | | | |
| 13. Students engaged in activities that integrated multiple subjects and subject areas. | | | |
| 14. Students had freedom of movement and placement during activities. | | | |
| **CLASSROOM ARRANGEMENT/ENVIRONMENT** | | | |
| 1. Materials and/or manipulatives were available for hands-on student practice. | | | |
| 2. Student work was displayed. | | | |
| 3. Transitions were quick and efficient. | | | |
| 4. Technology was accessible for student use. | | | |

# APPENDIX E: T3 OVERALL CLASSROOM OBSERVATION INSTRUMENT

| **TECHNOLOGY** | **#** | **1** | **2** | **3** |
|---|---|---|---|---|
| 1. MP3 player/iPod | | | | |
| 2. Tape player/radio | | | | |
| 3. Interactive whiteboard/SMART Board | | | | |
| 4. Flip camera/video camera | | | | |
| 5. Digital camera | | | | |
| 6. DVDs/CDs & headphones | | | | |
| 7. Skype/video communication | | | | |
| 8. Laptop computer | | | | |
| 9. Desktop computer | | | | |
| 10. Television | | | | |
| 11. Document reader/Projector | | | | |
| 12. Overhead projector (traditional) | | | | |
| 13. Handheld game/device | | | | |
| 14. Other _____ | | | | |
| **TEACHER USE OF TECHNOLOGY** | | **1** | **2** | **3** |
| 1. Teacher integrated technology into lesson | | | | |
| 2. Teacher assisted students with technology | | | | |
| 3. Teacher used technology as a communication tool (e.g., Skype, email/chat) | | | | |
| 4. Teacher used technology to create lessons | | | | |
| 5. Teacher used technology to access the Internet | | | | |
| 6. Teacher used technology to display material/assignment | | | | |
| 7. Teacher used technology to assess/correct assignment | | | | |
| 8. Teacher used technology as a communication tool | | | | |
| 9. Teacher used technology for a non-instructional purpose (e.g., checking email) | | | | |
| **STUDENT USE OF TECHNOLOGY** | | **1** | **2** | **3** |
| 1. Students used technology to enhance problem solving/creativity | | | | |
| 2. Students used technology to learn basic skills (e.g., tutorials, drill & practice) | | | | |
| 3. Students used technology to access the Internet | | | | |
| 4. Students used technology as a communication tool (e.g., Skype, email/chat) | | | | |

| | | | |
|---|---|---|---|
| 5. Students used technology for word processing | | | |
| 6. Students used technology for assessment purposes (e.g., individualized tracking, Acce Reader) | | | |
| 7. Students used technology for independent inquiry/research | | | |
| 8. Students used technology to produce new knowledge | | | |
| **TEACHER INSTRUCTIONAL BEHAVIOR** | **1** | **2** | **3** |
| 1. Teacher actively facilitated students' engagement in activities and lessons to encourag participation | | | |
| 2. Teacher linked concepts and activities to one another and to previous learning | | | |
| 3. Teacher applied new concepts to similar situations (elaborated) | | | |
| 4. Teacher connected ideas and concepts | | | |
| 5. Teacher initiated experiences, discussions and activities | | | |
| 6. Teacher acted as coach/facilitator | | | |
| 7. Teacher allowed students to develop concepts or procedures | | | |
| 8. Teacher provided students opportunities for problem solving | | | |
| 9. Teacher asked many open-ended questions | | | |
| 10. Teacher provided adequate feedback to students (answers, information, etc.) | | | |
| 11. Teacher provided direct instruction for the entire class | | | |
| 12. Teacher assisted students to organize thinking (identify and describe patterns) | | | |
| 13. Teacher integrated feedback and assessment into instructional cycle | | | |
| 14. Teacher initiated project-based learning activities | | | |
| 15. Teacher let students develop concepts or procedures | | | |
| 16. Teacher related concepts to students' actual lives | | | |
| 17. Teacher provided opportunities for students to assume responsibility and initiate classr activities | | | |
| 18. Teacher used a variety of modalities including auditory, visual, and movement | | | |
| 19. Teacher varied styles of conversation and participation to include students' cultural pref | | | |
| 20. Teacher provided opportunities for students to be creative and/or generate their own id and/or products | | | |
| 21. Teacher offered encouragement of students' efforts that increased students' involvement and persistence | | | |
| 22. Teacher appeared to have warm, supportive relationships with students | | | |

| | | | |
|---|---|---|---|
| 23. Teacher displayed negative affect toward students | | | |
| 24. Teacher monitored/checked student work | | | |
| **STUDENTS' INSTRUCTIONAL BEHAVIORS** | **1** | **2** | **3** |
| 1. Students initiated and assumed responsibility for learning activities | | | |
| 2. Students connected ideas and concepts | | | |
| 3. Students utilized different ways to answer (alternative solutions) | | | |
| 4. Students were engaged in classroom activities | | | |
| 5. Students' activities were learner-centered | | | |
| 6. Students solved problems using real objects in the classroom environment | | | |
| 7. Students displayed positive affect toward teacher | | | |
| 8. Students displayed negative affect toward teacher | | | |
| 9. Students displayed positive engagement with peers | | | |
| 10. Students worked with other students in small groups | | | |
| 11. Students displayed disruptive behavior | | | |
| 12. Students did independent seatwork | | | |

**Overall Rating: 0=No use; 1=Low-level use of computers; 2= somewhat meaningful; 3=meaningful use; 4=very meaningful use of computers**